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THE THIRTEENTH CENSUS

The virtual removal of the head of the Census Bureau and the substitution of a successor, coincident with the advent of a new national administration, has necessarily brought forward some crucial questions respecting the principal statistical office of the nation. Many of these relate to semi-political issues. This is not the place to discuss them. But behind these lies the question of the future of the census, and of how that future will be affected by the past management of the organization. Into such a discussion there necessarily and unavoidably enters a political element. That, however, is not its chief feature. When all has been said, the problem whether the census has or has not been efficient during the thirteenth decennial enumeration, and if not, whether and how it will ever be possible to get a good administration of it, remains the central point.

I

At the outset it should be stated that the complete data for an accurate, inclusive, and thorough comparison of this census with its predecessors are wanting, and that to the extent that they are absent a judgment cannot be absolutely final. Thus far there have been issued Vol. IX and Vol. VI, and the Abstract of the Census, all in permanent form. The volumes now coming to hand include the following official explanation of the present state of things:

Of the final census reports listed on page 3, Volumes VI and IX have thus far been issued.

The volumes numbered I to XI, constituting the complete reports of the census, are being issued in a very limited edition, intended chiefly for libraries, institutions, and special students of statistics.

A condensed report, entitled Abstract of the Census, has been printed in a much larger edition, intended for more general distribution, and prepared in such a way as to meet the need of most persons desiring information concerning the results of the census. It contains in tabular form all important census statistics for the United States as a whole and for each state and principal city, together with a brief text explaining the figures and their meaning. The Abstract therefore is a condensation of the complete census reports, both tables and text, and not merely a compilation of tables.

The Abstract is issued in special editions for each of the several states, each edition containing a supplement giving the detailed statistics for counties, cities, and other civil divisions of the state to which it relates, designed to meet the needs of persons resident in that state or especially interested in it. The supplement contains also both tables and text.

As a compact reference work of general and local interest the Abstract is more convenient for most persons than the voluminous final reports.

There remain, therefore, still to be published nine out of eleven volumes of the final reports, so that by no means all of the data to be printed are within reach. But the census abstract is, as officially indicated, far larger and more complete than ever before and it covers, to an extent, the whole of the ground included in the scope of the census. This makes it possible to study the work as a unit, although somewhat from a distance. It must be admitted, however, that the complete data are not available, despite the circulation of many bulletins and outlines that give the persistent inquirer an idea of the facts.

Moreover, it is unlikely that these data will ever all be available. Many of them are already old and out of date. Appropriations for their immediate publication are wanting. It is doubtful whether they will even ultimately find their way to the hands of the public. If they do not, a final and absolutely authoritative judgment upon every portion of the census can never be rendered.

This general concession and reservation, however, itself carries a serious implication and registers a far-reaching and emphatic judgment upon the situation. Why was not the census completed and

issued earlier? This question stands out as one of the significant and basic problems in the whole situation. The fact that publication has been delayed far past the customary time is officially explained by the fact that Congress during the spring of 1912 refused an extra appropriation of $500,000 which had been requested, and that in consequence it was necessary to discharge a large proportion of the force then on the rolls. Thereby the publication of the data already compiled was deferred and the compilation of still other data from the census schedules taken in the course of the enumeration was either stopped or greatly hampered. It is a fact that the legislative body did refuse to grant the appropriation asked for by the head of the census in the spring of 1912. But it is also a fact that prior to that time the census had received and had spent the whole appropriation of $14,000,000 which had been estimated as the amount necessary for the collection and publication of the data. Any reply to criticism which rests simply upon the failure of Congress to grant more money is, therefore, superficial, since to appraise this refusal correctly there is needed a review of the work of the census designed to test the legitimacy of the call for more money. Before proceeding to such a summary review it is, however, desirable to remark that wherever the responsibility for non-publication of results be placed, the delay is in itself enough to destroy in very large measure the utility of the figures themselves. These may be considered as having a two-fold purpose, as scientific records for the use of statisticians and for the development of statistical inferences, and as data designed for the enlightenment of business men and public officers with respect to current conditions and the progress of the nation. While the former use may in some measure be fulfilled by the figures, however late they may be issued, the latter can never be accomplished unless the facts are put within the reach of the commercial community before they become obsolete.

The fact that the most obvious test of the utility of any census is the promptness with which its figures are made available has long been recognized even by Congress. The Twelfth Census enumerated the population, compiled results, and published nearly all its data within two years, bringing out one of the population volumes

as early as December, 1901. When the Thirteenth Census was undertaken it was desired by Congress to get the results of the work as promptly as had been done ten years before. As a census expert states it, Congress "secured by mandatory law the completion and publication of the Twelfth Census in two years. The same mandatory provision was re-enacted in the present law. No one doubted compliance with this provision, and the appropriation was voted in the belief that the time limit section would be obeyed. The appropriation granted was exactly the sum estimated as ample not only to complete the main reports of the Thirteenth Census within the time requirements but also to carry on the permanent annual work of the bureau relating to cotton, mortality, etc."

II

The census office was placed upon its present footing almost immediately after the inauguration of the Taft administration in the spring of 1909. When President Taft entered the White House the Census Bureau was still on a limited permanent basis but was preparing to undertake the task of collecting and issuing the regular decennial figures. It had been supposed that the permanency of the bureau and the partial application of civil service methods of appointment in its staff during the nine years then past would result in fewer changes of personnel and particularly in retaining at the head of the office the man who was in charge during the period intervening between the census periods. It was not long, however, before clashes occurred between the head of the bureau and the new secretary of commerce and labor. Into the merits of the controversy then developed it is not necessary to enter. Before the discussion had lasted thirty days, it had been resolved by the new administration to vacate the headship of the office and to appoint Dr. E. D. Durand, then head of the Bureau of Corporations, to prepare for and conduct the Thirteenth Decennial Census. The change was accordingly made and the new chief was placed in charge at the close of the spring of 1909. It was announced in a semi-official manner from the White House that the bureau was to be conducted absolutely free of political or personal influence, and upon a basis of scientific and non-partisan effort in such a way as to secure

the most speedy, most thorough, and most far-reaching census yet taken. For this purpose the sum of $14,000,000 already referred to shortly became available.

Upon assuming control of the Census Bureau, and prior to beginning the real work of the census of 1910, the chief of the bureau found himself confronted by a difficult situation. In charge of the several divisions of the census were chief statisticians whose work had in some cases been open to serious criticism for years past. Had the Census Bureau gone out of existence in 1900, as was the custom of former years, these places would probably have been filled with new men when the work of the census of 1910 was begun. The permanent census act retained the organization of the bureau and kept the chief statisticians in charge of their several divisions, notwithstanding that it was often hard to find anything for them to do. The new head of the bureau was alive to the desirability of making some changes in the force. These had been recommended to him from many responsible quarters and he had himself indicated a disposition to undertake some of them. Whether because of political difficulties or from a feeling that changes would cause more friction than they were worth, the proposed alterations were nevertheless not made. The staff was continued upon its old basis. But, recognizing that the men in charge were not, according to his own point of view, altogether qualified for the work, the chief determined to supplement their efforts by employing a very considerable number of college and university men as special advisers and experts. These men were first to operate in reframing the schedules and later to help out in connection with specially difficult or technical phases of the actual investigations and reports.

Early in the summer of 1909 the task of reframing the schedules was therefore begun by large bodies of men supposed to be specialists in the various branches of economic study to which these schedules were most closely related. These experts were requested to produce the best possible list of questions for use in each of the branches of the census. The results were discouraging. Few of the "experts" had had any experience in practical work or were conscious of the practical problems or of the limitations of the census-taking process. Long, windy, and wearisome discussions resulted

in impossible attempts to put vague, hazy, or unpractical theoretical ideas into effect. An example of the net outcome of this work will presently be shown, but at this point it is enough to say that the results of the theorists' work were wholly impossible, and were admitted to be so by many of the very men who were engaged in the task.

And yet these bodies of theorists might have produced results possessing the qualities of their defects as well as the defects of their qualities, had they been left to carry their efforts through to a logical conclusion. This, however, was not to be. As has been seen, the old chief statisticians had been retained in their places as heads of divisions. They were not pleased with the calling-in of the experts nor were they inclined to accept the results of the work. They consequently proceeded to modify the schedules to suit themselves with the result that the lists of questions became illogical as well as impossible. Finally, the assistant chief of the bureau took up the lists and re-revised them. The results of the process were as follows:

1. Entire lack of responsibility for the ultimate form of the schedules.

2. Lack of cohesion, unity, and harmony within the schedules themselves.

3. Obscurity, excessive length, and impracticability in some of the schedules, notably that on agriculture.

This process was not only unsatisfactory but it was tremendously expensive. One who has been intimately associated with the census and who is recognized as an authoritative author on census topics, writes as follows:

> Much was squandered upon the foolish experiments of the director in connection with a faculty he established of collegiate theorists who were entirely ignorant of the practical problems and limitations of the census. These alleged experts made impossible attempts to improve upon previous census presentation which have resulted in actual retrogression at numerous points, because they destroyed many comparisons, which are vital in all statistical work. The curse of American census administration has been the craze to tinker and improve. In consequence, except in 1890–1900, non-comparable census figures are the despair of students.

It might still have been possible to rectify the census schedules had there been complete willingness to do so. In some instances the lists of questions were recognized as being unsuitable and an effort was made by certain of those connected with the work to obtain genuine expert aid. The mining schedule affords a concrete example of the vain results of such efforts. After the original mining schedule had been completed, it was submitted to a distinguished mining engineer for an opinion regarding its practicability. The engineer went over it, made some important suggestions, and furnished a memorandum embodying them to those in charge of the work. None of the suggestions was adopted. Moreover, portions of the schedule which the engineer had shown to be absolutely impossible in practice were retained, verbatim, because, apparently, of the trouble and expense of changing the printed forms. Bad consequences were inevitable, and when they began to appear, as census-taking proceeded, it was necessary to send special agents to try to bring about a rectification of the data. That, however, proved to be a hopeless task because of the impossibility, under present bookkeeping conditions, of getting with any degree of accuracy the returns which were called for.

An actual exemplification of the work done by the experts employed on the schedules will make the point of this criticism clearer. Such an exemplification is afforded by the agricultural schedule, containing as it did hundreds of questions—probably about 750, according to a fair method of counting. A review of this document must undoubtedly lead to the following conclusions:

1. That the schedule was exceedingly complex.

2. That many of the questions were so general or so badly worded that correct answers were an impossibility.

3. That much of the information thus sought was, in the nature of things, unobtainable.

4. That, in consequence of these facts, scientific tabulation and use of the information obtained from the completed schedules was out of the question.

Moreover, when the schedule was put into the hands of enumerators, the situation was rendered even more embarrassing by the following circumstances:

1. Enumerators were so slowly and defectively examined that they were really named without examination.

2. Hence they were an uncommonly incompetent body of men.

3. Even with a much simpler schedule these enumerators would not have been able to understand and effectively put the questions.

4. The time allowed for filling this long, complex schedule was out of all proportion to the meager pay allowed for it.

5. Hence even the capable enumerators did not or could not spend time sufficient to get results.

6. The net outcome of these conditions was an exceedingly inaccurate, confused, and incomplete set of schedules.

III

Shortly after the schedules had been returned to the office and work had been actively begun under the new census organization with a view to compilation and tabulation, it became evident that there were likely to be unexpected delays. When the census of 1900 had been in process, considerable use had been made of machines for the punching of cards upon which the data of the census schedules were reproduced. After the census of 1900 was over, there began to be grave doubt whether it was worth while to use these machines at all. Many persons believed that the supposed advantages of the machines were open to very serious question. The whole subject was taken under advisement, and upon a review of the events of the census of 1900, it appeared that the machines employed in that census had been manufactured by a private contractor at a cost to the government of $400,000. The headship of the census office was changed not long after the work of the census of 1900 was completed, and the new chief who then assumed control undertook to obtain the development of a new type of machine for use in the census of 1910. At the time when the headship of the bureau was again changed in 1909 it was supposed that the new machine had been practically perfected by inventors working in the employ of the government. The new census started with one machine which had been carefully constructed in the office itself and had given fairly satisfactory results. Other machines of like character were soon built and as soon as the population data came in the process of punching was begun.

As is well understood by those who have followed the development of the use of machinery on statistical undertakings, the routine statistical process of census tabulation is based upon the transfer of the returns indicated on the census schedule to corresponding cards upon which the data are represented by holes punched in specified spaces, the space selected and the symbol punched representing a given character of the return. When cards have been punched for each of the classes of data represented on the schedule, it is possible by the use of electrical machinery, a contact being made through each of the holes as the card is fed into a machine, to consolidate the data for final tabulation. The machines used in the census of 1900 both for punching and for consolidating the returns were somewhat slow and, it was asserted, not altogether accurate. In fact, a hand-tabulation of certain data, made after the close of that census for the purpose of testing the accuracy of the mechanism, showed a substantial percentage of errors, although this percentage was far less than had been charged by many of the critics of the figures given. It was, however, this dissatisfaction with the machines that led to the effort to perfect modified types of the mechanism, both for punching and for tabulating, which might be superior to the old ones, while at the same time, it was desired to free the census if possible from the heavy royalty payment which had been so expensive an element in the census of 1900.

The new machines, however, shortly turned out to be a great disappointment. They proved to be inaccurate, and, in consequence, a very large force for the rectification and verification of the cards had to be organized. In former years it had been the practice not to announce gross results for given census areas until the punching process had been completed. Because of the extreme delay due to the defects of the machine a new plan was adopted and results were announced in the gross without waiting for the detailed punching of cards representing all of the returns. This enabled the census in part to meet the demand for early preliminary results and thereby mask the real retardation of the work. This retardation was, however, present in even more aggravated form because of the time lost in announcing the advance summaries of the figures. The delay showed itself as soon as it was sought to get out detailed

bulletins, for the accumulated effects of the loss of time due to the early delays with the new machines then became obvious.

On the other hand, it should be noted in passing that a part of the basis upon which estimates had been made with reference to the total cost of the new census was in the supposed saving to be realized from the machines. This turned out to be an unfounded expectation. The new punching machines cost the office about $250 each, while the old ones originally cost $40 and could have been made ready for use in the census of 1910 at a cost of only $5 to $10 each, according to expert estimates. The payment for operating the old machines was at the rate of 30 cents per 100 cards, while on the new it was 20 cents, so that the possible saving, investment of capital and other factors being considered, could not have been very great in any case. It was estimated that, had the machines worked properly as they were expected to do, about $90,000 would have been saved during the whole course of the census. Probably as much or more than that sum was used in doing extra work made necessary by the blunders and delays of the machines. It was the belief of the head of the Census Bureau that, in spite of the difficulties, the policy of developing this machine was wise and that, in spite of the delay and the additional cost, the future results will in all more than compensate for any sacrifice involved in the process of preparing the census of 1910. The fact remains that the census of 1910 did suffer very seriously in its earlier stages from the difficulties already referred to. Reference has above been made to the extensive and complex character of the agricultural and other schedules. This in itself was the cause of very great delay; while the processes of comparing, reducing, and unifying the figures were themselves lengthened and postponed owing to the problems of internal organization presented by the schedules already referred to. It was not strange, therefore, that practically from the time the process of tabulation and even of punching began, there should be continuous postponements and delays. These became cumulative and ultimately resulted disastrously.

Additional to the troubles which have just been sketched was the fact that, throughout the whole process of census-taking, it seemed to be difficult if not impossible to maintain a sufficiently stable body of employees. Mention has already been made of the way in which

the assistant director first appointed, participated in the framing of the schedules. It was essential that, if possible, men should be retained throughout the whole of the process of census-taking, in order that they might, if practicable, profit by the experience thus obtained. The assistant chief, however, did not long remain, and when he withdrew from the census he was succeeded as assistant chief by another man, who was obliged to work slowly into the duties of his office, getting his experience in the process of doing the work. Chief clerks of the Census Bureau—officials whose duties were vital to the smooth running of the force—succeeded one another with great rapidity: there were four in succession during the first three years of the census. Moreover, the clerical appointees who were selected were ill qualified and shifting, due to a peculiar provision in the civil service law, inserted just before the beginning of the work, which required applicants to have resided, for a year previous to appointment, in the states from which they came. Only under very limited and restricted conditions was the head of the bureau allowed to select experienced clerks who had had to do with former censuses.

IV

The difficulty in getting enumerators into the field with practicable schedules and the internal mechanical problems of compilation were, however, responsible only for delay and for primary imperfections in the returns supplied to the bureau. A proper use of these returns, a suitable editing of the data, a bringing of the information into harmony with itself and with that obtained in former censuses, might have resulted in securing a good body of figures, even had these figures been late and unavailable until their usefulness had partly passed. The question whether such a serviceable body of figures was or was not to be obtained was necessarily to be settled by the way in which the information was treated after entering the census office.

In former censuses it had been found that the data sent in by the enumerators were full of errors and imperfections. As a result of this state of things, it had been deemed necessary to edit the returns with considerable care. The consequence was a very material amount of departure from the original data as drawn from the schedules. Such variations had been strikingly made evident

in connection with the census of agriculture in 1900. The information then obtained differed so widely from any known facts that an investigation was made by commercial bodies, with the result that the use of a very extensive process of editing was revealed. This process of editing had involved considerable changes in the schedules themselves to correct manifest absurdities, the rectification of the figures by the use of test tables relating to crops, yields, prices, and so forth, for the various districts, and finally the writing of many thousands of letters to persons who were believed to have made erroneous returns either intentionally or unintentionally. It was a fair question whether this process ought to be pursued in connection with the census of 1910 and if so how far it should be applied. The matter was carefully considered.

It was, however, decided not to edit the census of 1910 to any such extent. The verdict rendered was based upon the well-founded beliefs that in former years the editing had given the census returns a character wholly different from that which they would otherwise have possessed, that errors in a large statistical undertaking tend to cancel one another, and that honesty demanded the presentation of facts exactly as ascertained. There is much to be said in favor of this view. If successfully adopted it would go far to wipe out many of the disgraces of past censuses when figures were shamelessly manipulated in order to show "prosperity." But —and this is essential—the attitude of superior righteousness could wisely and sanely have been accepted only if the takers of the Thirteenth Census were supremely certain that, because of the intrinsic merit of the methods employed in getting the figures, their work made a greater approach to real accuracy than did that of previous censuses. That they had no right to feel such certainty has already been pointed out. The decision to print the figures with but little editing was, therefore, of highly questionable wisdom and probably should not have been made. Whatever may be thought of it, the fact remains that the data for 1910 and 1900 are not comparable, that no one pretends that they are comparable, and that the data for 1920 will not be fully comparable with those for 1910 because of the manifest errors that appear in the figures now made public for the Thirteenth Census.

It may be inquired how these errors are to be detected in the

Thirteenth Census, if it be true that past censuses afford no absolute guide because of the fact that their data were so elaborately edited as to destroy all real basis of comparison with the figures now made public. This is a fair question. The belief that the failure to edit figures and the character of the schedule have resulted in actually erroneous returns, is based upon what is known of the general facts in the situation as drawn from other and collateral sources—from trade compilations of figures, from figures compiled by states, and from the computations based on earlier groups of figures which have had a known development from year to year. There are many striking facts in the new census to which it seems impossible to give credence and to which such credence is in fact refused by men experienced in the lines of work to which they relate. It would be impossible to cite the facts which justify this remark in much detail, but an example may be furnished. The census of agriculture shows that there was a tremendous falling-off in the number of cattle, swine, and sheep between 1900 and 1910. Of cattle this decrease amounted to 5,915,544, while of swine it was 4,682,365 and of sheep 9,055,852. The census admits the erroneous and non-comparable character of these figures by the remark that "due consideration must be given to the fact that the enumeration of 1900 was as of June 1, while that of 1910 was as of April 15. Had the census of 1910 been taken as of June 1, the number of animals . . . . especially of cattle, swine, and sheep would have been materially greater than reported." And again: "Had both censuses been taken as of June 1, there would probably have been much less decrease in the number of cattle and of sheep, a moderate increase in the number of swine, and a somewhat greater increase in the number of horses and of mules." This is a confession that the figures as given are worthless or nearly so, and is also an admission that no effort was made to make them comparable by reducing them to an April 15 basis or by furnishing an average corrective table. Cases somewhat like this could be multiplied, but a briefer way to test the value of the figures is that of ascertaining the views concerning them entertained by practical experts who have examined them with a view to actual professional work. The utility of the figures for such a purpose is after all the ultimate test of the success or failure of any such great statistical undertaking. And, in the last analysis

the worth of such figures is the value received from them, or ascribed to them, by those who are dependent upon them for information. Tested by this standard, the census data as tools of immediate use appear in their true light. In that light they are today adjudged nearly worthless, for such is the almost uniform verdict of the men who are engaged in pursuits that involve a reliance upon census information. Reference has already been made to the mining census. An unquestionably competent mining engineer and statistician writes of

> the very unsatisfactory character of the census work in connection with the mining industry. The whole thing is almost destitute of value. The fact that the mining engineering papers do not take the trouble to quote the census figures to any extent, or scarcely to mention them, ought to make it obvious . . . . that something is wrong. Speaking plainly, the thing that is essentially wrong is that the census work on this subject is in the hands of officials who do not know anything in particular about the mining and metallurgical industry. I have no doubt that if the original returns now in the census office should be put into the hands of an expert he could dig out a good deal of value, but in order to get the best results in the taking of another census, the work ought to be under the direction of an expert from the beginning.

And again:

> I have no desire to dig into the original returns received from the last census, nor do I advise the census officials to undertake that on their own account. The census returns are now several years old and a research into ancient history would be of no particular use to anybody. What I want to urge upon the new director of the census is the necessity for putting the technical statistical investigations in the hands of experts who know something about the industries concerned. Mr. ——— and Dr. ——— are not such men. So long as the census work is steered by such incompetents as they are, so long will the results be devoid of any great value.

Similar complaints regarding the various divisions of the census might be multiplied. Without much question, it would be entirely possible to reproduce the substance of the above letter with regard to almost every division of the census figures, the statements being in each case drawn from men who stand pre-eminent, and are of undoubted authority, in their several divisions of practical endeavor. This is true of agriculture, of manufacturing, and of mining so far as the data are as yet available. It is probably less true of population than of any other; although in connection with population figures some serious errors have been committed and trustworthy men

decline to accept the results furnished as regards some of the chief work of the Bureau in this regard.

It is enough to say broadly that practical men feel much more than the usual distrust they are in the habit of displaying toward census figures and that they are able to furnish apparently good reasons for their view that the data do not correspond to actual conditions as known to them.

Another natural and legitimate test of the worth and accuracy of the census results is afforded by the degree of consistency with themselves which the figures exhibit. If the data show results that do not accord with other findings given or inferable elsewhere in the census, students will naturally hesitate to accept any of the data as reliable. How far then are these census figures self-consistent? An enlightening example of the work that has been done is found in the bulletin dealing with the output of dairy products where it appears from the county tables of the New York Bulletin under the heading "Milk Produced & Sold" that Alleghany County produced 13,668,000 gallons of milk and sold 14,799,000 gallons. Several other counties also succeeded in selling more than they produced. Moreover, if the cream and butter fat sold in the entire state of New York come from milk, then New York, according to this bulletin, sold many thousand gallons more of milk than the state produced, even though no allowance be made for home consumption.

The accuracy of the figures may be tested in another way by comparison with the like or corresponding data furnished in the Twelfth Census. The Twelfth Census reported that New York produced in 1900 772,799,352 gallons of milk, but the Thirteenth Census now reports only 597,363,198 gallons. He would be a superficial student of American agriculture who did not know that during the past ten years there had been a decided improvement in dairy farming in the state of New York. The only conclusion, therefore, must be that there was a colossal blunder in 1900 as to these figures or a gross error today. The lay reader cannot settle in his mind which of these alternatives to accept, but of this he will be sure—that he should have been satisfactorily advised of the probable cause of the discrepancy and that he should have been supplied with estimates designed to furnish corrective data that he

might apply at his convenience for purposes of comparison. This is merely an illustrative and representative instance of the character of the census figures. To multiply such instances would occupy unlimited space but would not alter the nature of the criticism.

V

What will be considered by many persons the breakdown of the census of 1910 is the more regrettable because it undoubtedly deals a serious blow to the movement for a scientific and permanent Census Bureau. The principal argument that has been urged in past years in behalf of the placing of the census upon a permanent basis has been the fact that thereby efficiency, speed, and technical capacity would be advanced and the decennial renewal of a purely political, slow, and incapable force would be avoided. The argument in favor of putting a scientifically educated student of economics in charge of the bureau has been that by so doing statistical methods and administrative management would be improved, the tone and the personnel of the undertaking would be raised, and the general conditions under which the work would be carried on would be improved. Experience has furnished some ground for the belief that nothing has been gained in personnel, while there has been actual retrogression in the matter of speed and real efficiency and probably in the technical value of the figures themselves. The latter point, as has been elsewhere noted, may possibly be considered, in a measure, still open to question, if viewed from a long-range standpoint. From a closer point of view it is certainly the case that the figures for the census as now presented are less available for immediate use and less closely comparable with those of former years than has been the case during any census of recent decades. Believing this, members of Congress and others vested with authority will almost inevitably be disposed to discriminate against the idea of the permanent scientific bureau and to do what they can in favor of the restoration of the old conditions. The trend of the reaction is already observable in the substitution of a political appointee for a statistically trained man in charge of the bureau.

H. Parker Willis

SYSTEMATIZED AND SCIENTIFIC MANAGEMENT[1]

The purpose of this paper is twofold; first to describe and explain if possible scientific management, not in technical terms, but by comparison with other types of management with which all are familiar, so as to show wherein it differs in the makeup of its elements; and secondly, to establish the setting, or, to use a phrase familiar in debating, to state the question.

Every manufacturing or mercantile business is made up of different processes which are more or less interdependent. In order to secure the best results, it must be so organized that the separate processes, and the unit members within these, will be brought into systematic connection and operation as efficient parts of the whole. To bring about and maintain this result is the function of management: to do it to the highest known degree is possible only by what we choose to call the science of management.

All types of management seem to fall into three general classes, which, for want of a better terminology, we shall call (1) unsystematized, (2) systematized, and (3) scientific. Of course no classification of this kind is exact. Some departments of a business may be conducted according to the standard of one, while other departments may be in another class, but on the whole, this seems a natural division.

Let us look briefly at the five important features of every manufacturing plant, excluding designing, advertising and selling. These are: (1) accounting and costs, (2) purchasing, (3) storage of materials, (4) execution of the work, and (5) efficiency of the worker.

We shall pass hurriedly over these five features of the unsystematized type of industry, because this type is so well known, and is

[1] Much of the substance of this article—a paper read at the Western Economic Society's conference on Scientific Management, March 14, 1913—has been used previously in the author's address on "Types of Management" before the Tuck School of Dartmouth College. Nevertheless, the article is printed here, with the consent of the Director of the Tuck School, because of its relation to other articles in this and preceding issues of *The Journal of Political Economy*.—THE EDITORS.

seen everywhere. It earns its title "unsystematized," not because its profits may be unsatisfactory, since profits are an indication of difference between costs and selling values only, and may for a variety of reasons not be dependent on an efficient form of organization, but because, as an organization for efficient work, it leaves much to be done.

The unsystematized business still depends for its accurate knowledge on the balance sheet, secured after the annual inventory is taken, which may be weeks or months after the year's business is closed. Very little attention is paid to accurate cost systems, monthly earning sheets, etc. Purchasing is done without the aid of accurate specifications, and complete knowledge of the quantities on hand and available. Stores and merchandise are generally in disorder; and accurate information as to location and quantities is wanting, as are suitable storage facilities. The execution of the work depends on the verbal or incomplete information which is passed down the line from sales department to workman, each man from manager, superintendent, foreman, and boss, adding from his knowledge and experience, with the intention of ultimately informing the journeyman worker what is wanted, but really relying on him to produce it. Under such management, the efficiency of the man and machine cannot help being low, especially in comparison with the other types. Unsystematized shops of this description are run on the single foremanship plan.

SYSTEMATIZED MANAGEMENT

Wherein does systematized management materially differ from scientific management? It is methodical, desires all departments to be run in an orderly fashion, and gets them to going that way. It asks: "What more can be done? Isn't this the highest form of organization known, and can there be anything much better? Isn't scientific management only another name for what I have, and are not its alleged superior results apparent only in contrast with the unsystematized plant?" To show that the form of scientific management is fundamentally different, and to show that the results of well-known elements, used in a different combination, is different, is the task set us.

We must admit at the start that a well-systematized plant has great advantages over the unsystematized, that much of the organization work has been well done, and that the efficiency of parts is good. Let us take, however, a brief look at the systematized form of business and endeavor to do it full justice.

1. *Accounting.*—Accounting in a business includes not only the ordinary bookkeeping, but the entire clerical system which has to do with orders, records and costs. Accounting is the only means by which the management is informed from time to time of the condition of the business, the progress it is making, its weak and strong points, its selling values and costs, and the efficiency of all its departments. How thorough, lucid and complete the information is, as shown by the books, indicates to some extent the efficiency of the management and its grasp on the affairs of the company. In the unsystematized plant the accounting generally consists of a statement prepared after the annual or semiannual stock-taking, which shows (1) Profit and Loss; (2) Assets and Liabilities. It may possibly show profit and loss by departments or by products, but this last depends on a correct method of ascertaining costs which the unsystematized plant seldom has. Such statements are merely a record of an historical fact in most cases. If the statement is bad it is too late to remedy the troubles of the previous year because it shows merely the result of that year. Frequently, owing to imperfect methods of stock-taking, appraising and compiling, the yearly statement may be delayed; the history it tells then is ancient.

Under systematized management that has been changed. The books now show the condition of the business quarterly or monthly and in considerable detail. This detail will include the comparative feature; that is, for example, last year's cost to date with this year's cost for the same period, for a given department or product; it will show costs of materials and labor, and the proportion of overhead charges that make up the cost of a single job or a given product. Such results may even be charted and shown in graphic form to the management each month. Other records will come up weekly or even daily. As accounting is the means by which is ascertained the exact condition of the business at a given time, the systematized

management recognizes the importance of this information. Much of this accounting, however, is done with the ultimate end of securing correct costs, and these cost data are relied upon almost wholly, (1) to establish the selling price, and (2) to point out excessive costs and indicate perhaps where they may be reduced. Many persons believe that when their accounting is well done they have a systematized and efficient plant, but this really covers one phase only of the management.

Frequently, too, the clerical work in the different departments is not a part of the general accounting, and is not controlled by the ledger accounts. In other words, the same general system of accounting does not permeate the whole plant and help to support itself.

2. *Purchasing.*—The purchasing of materials, stock and miscellaneous supplies under unsystematized management may be done by one man or by a purchasing department; but more likely this duty is not very well defined and the purchasing is done by a number of persons, especially those needing the material. Little study is put on the standardization of materials, and different kinds of stock for the same use are often bought. This tends to remnants on some kinds, overstock and understock on others. The buying is seldom done on exact specifications, and not always even by written order, nor is there a predetermined maximum and minimum established for each article that should be carried in stock. The head of the business or the buyer may be an exceedingly shrewd trader and may buy very closely at times; but he will not always buy the materials best suited to the work, often overbuys or underbuys for lack of definite information, and is frequently tempted by bargain lots that seem cheap but may cost more to use in the shop. Then too, much more money is tied up in materials and storage space than is required.

In systematized management materials and supplies are purchased through one man or department, a maximum and a minimum are generally established, and a decided effort made to purchase the materials best suited to the workrooms. Some analytic methods are used in determining the proper materials, and standardizing is done on the more important kinds. This purchasing depart-

ment aims to have a stock of everything required, but buys largely what it is asked to buy. It does not always make purchases on complete specifications, and a lack of thorough standardization increases the detail of that department. So far as the clerical system is developed, however, it is generally good.

A well-known railroad president some time ago stated, at the Interstate Commerce hearings, that the railroads had reached their ultimate goal of efficiency. It is interesting in the light of this statement to note an example of efficiency in purchasing by one system of railroads, which has been acknowledged by railroad officials as leading in this particular department. This is the purchasing done by Mr. Thorne, who buys over $40,000,000 worth of materials annually for the Union Pacific and Southern Pacific railroad systems. When Mr. Harriman took over a railroad he would go to any expense in order to standardize every particle of material used. Mr. Thorne is the man who carried this out. In a letter some time since he told me that in the standardization of printed forms alone he had saved over 30 per cent in the purchase of that particular commodity. From what I have seen of the methods of this office, I believe that a large percentage has been saved over what was customary earlier in the history of that railroad, and over what is customary in a good many competing roads today. It would require no such percentage of saving in the balance of the forty million dollars of supplies annually purchased, as was saved on the printed forms, to make a very material lessening of the budget of those roads.

3. *Storage of materials.*—Many manufacturers are willing to devote unlimited space to workrooms, not realizing that the room for the proper storage of materials is just as important and just as profitable as that used for manufacture. In the unsystematized plant there may be a general storeroom, but seldom are all the stores to be found in it, and generally they are piled around almost anywhere and in any way that happened to be convenient when they were received. The order in which such stores are kept usually depends upon the initiative of the men directly in charge, and seldom can one person assume or carry out this responsibility.

The storage of materials and purchasing are very closely related

to each other. Loss of time hunting for material is the same whether the material is lost in the storeroom or has not been purchased, and a lack of system in one department will undo attempts at system in the others.

A marked contrast to these storage methods will be seen at once in the systematized plant. Here is an adequate room in charge of a storekeeper who issues stores only on requisitions, and who is expected to keep his place neat and orderly and to deliver his stores on call. A perpetual list is kept in the office and balanced with the stores, and the balance is proved by an actual count of the stores once a year or oftener. Stores are partially classified and standardized to some extent. It is only the most-used stores that are assigned to orders before they are actually called for. The physical handling of the stores, moving them in and out of the storeroom, is done by the assistants of the storekeeper and the efficiency of this work and the orderliness of the department depend wholly upon the kind of man in charge. The central office can exercise very little real control in this department.

Not all systematized plants control work from a central planning station by writing the operations for each process before the work is started; therefore materials are not exactly predetermined and work is still likely to be started before it is discovered that some material is lacking. Neither are the quantities always kept up automatically through the purchasing department by a predetermined maximum and minimum of each kind. It is general practice also to have storage space for different departments, some of which are not under control of the office; for instance the miscellaneous supplies used for the power department for repairs, piping and plumbing, electrical maintenance, etc., may be scattered about with little idea of order, while the actual materials for use in manufacture may be in good order.

4. *Execution of work.*—Orders in the unsystematized shop are recorded in a simple manner, sometimes even received and transmitted orally by the salesman. These are described in part orally to the superintendent, who may further enlighten the foreman on any of the details of such orders. It is assumed that the superintendent knows his business, that the foremen know theirs, and a

workman is expected to sense what is wanted and to ask questions when he is not sure. In this way an attempt is made to fill in the exact and accurate information which the selling end either has not secured or has not transmitted in writing.

The "single foremanship" plan prevails where one foreman handles as many men as he can. The number of men and the amount of work he can look out for is limited by the amount of detail he can carry in his head and by his physical and nervous endurance. He gives work to each workman when the latter has finished his last job, and depends largely on the worker's knowledge of what to do and how to do it. As questions arise in the progress of the work, or where the written order is incomplete, the workman goes to the foreman who in turn goes to the office for instructions. Meanwhile progress on the work stops.

The workman goes for and selects his tools and appliances, and does his work in the way in which he is accustomed to do that particular kind of work. A difference in method of doing the same kind of work by different workmen and in different shops is often quite marked. A detailed schedule of the average workman's day in the unsystematized shop, where such day's work is varied, will show a surprisingly small proportion of effective time.

Piece-work is often used, but is bound to lead to inequality. The rates, determined by no exact method, are often subject to change, and the output of such piece-work is frequently limited by the unions.

In the systematized plant, this crude rule of thumb method has been changed. A complete set of order-cards for recording and transmitting orders is in use. The worker receives a written order for the work he is to do. But this seldom takes the form of an instruction card giving him complete information for every move and every tool. It is likely to say *what* the work is, assuming that he will do it in a satisfactory manner. Workers almost always record their time for each job on a card, which registers the labor cost accurately. They do not always register the time lost in securing tools, materials and further instructions. The planning of a job, except in plants where the work is very largely repetition, is likely to be done as the work proceeds. Piece-work is used wherever

possible and is considered the most economical way of performing a given operation. It is the aim of most systematized plants to secure as much piece-work as possible. This may be unfair for different kinds of work to both employees and employer.

Systematized management keeps things running smoothly, avoids most of the mistakes due to the lax methods of unsystematized management and turns out a good product But a lack of centralized planning and centralized control of the workers causes loss of efficiency. This is especially true in rush times, or when certain parts of a factory are congested. It is impossible then, with the means at hand, so to plan the work as to get it out to the best advantage; for with the foreman of one room or department planning his work, and another his, the two can seldom be made to interlock perfectly.

5. *Efficiency of the worker.*—Emphasis under systematized management is laid on knowledge of what the costs are, freedom from mistakes and bad work, and the greatest output of man and machine that can be secured. The standard for this output is generally established by the opinions or experience of the bosses, who have neither the time nor the training to ascertain it by exact methods. Great emphasis is put upon the installation of new and modern machinery, but not very much analytical work is done by the management to ascertain whether the worker is working in the very best possible way, or whether he is adapted to the particular job he is given. The person who has charge of the employment considers that there are four classes of people: men, women, boys and girls. If the foreman wants a girl, that is sufficient information for the one in charge of the employment, and a girl is hired and assigned. Little or no thought is given to the question whether that particular girl is the right one for the task.

For instance, in bookbinding there are different kinds of work. Laying gold leaf calls for a girl with small fingers and a delicate touch. Strength is not required. Another operation calls for a large, strong girl, who can easily handle bundles of work weighing seven or eight pounds. In proofreading the time reaction of seeing a word and grasping its meaning is a very important feature. Other girls doing inspection must have the ability to concentrate their

minds on one particular operation. The different kinds of work demand girls selected with special reference to their aptitude for their particular work. In every factory will be found workers in one department who cannot successfully do their work, but who could successfully do work of another kind. The scientific selection of the worker is almost unknown in the merely systematized plant, and this fact alone makes impossible the highest efficiency. Unfitness to work will cause a greater loss of earning power than most persons realize.

When I think over the psychology of industrial workers, I am reminded of my own experience in college. In the psychological laboratory tests were made on all my class. I had the quickest time reaction from seeing a flash to muscular action in pressing a button; I had the slowest time reaction in the class to seeing a word, comprehending its meaning, and then pressing a button which registered the time it had taken me to see and comprehend its meaning. This experiment showed why I was the slowest reader in my class and why on a given task in reading, in literature or any other subject, I took longer than anyone else. While I was not a sprinter, my record for the fifteen-yard dash has never been beaten,—not because I was a fast runner, but simply because the time reaction to muscular effort enabled me to get off more quickly after the pistol shot than anyone else. Now suppose that my whole course of training had been guided by my parents, as is the case with many, and that they had decided that after I left grammar school I should begin apprenticeship in a shop in a line of work in which my physical makeup would prevent my competing with others, or that I should study for music, book-keeping, accounting, typewriting, telegraphy, or any one of a hundred trades requiring the ability to read rapidly. Consider the certain outcome of such a selection.

The step from unsystematized to systematized management is a difficult one because it generally means a more radical change in the personnel of the supervisory force than does the further step. The unsystematic management is likely to associate with him men of a similar type. To do one's work in a systematic way is not wholly a matter of training, and the foremen and superintendents

in a thoroughly unsystematized plant cannot always develop the habit of working by means of system. The unsystematized plant still exists, either because its competitors are in the same condition or because there is a large difference between costs and selling price, or because the business is dominated by one or more strong characters whose ability in other phases of their work more than makes up for their lack in organizing ability. Sooner or later, however, this class of industries will be forced to change or be eliminated. This has already taken place in a number of industries, as for example, in the manufacture of shoes.

Twenty-five or thirty years ago there were more shoe shops than there are today. The competition in manufacturing shoes and the intricacy of the detail have made it impossible for the unsystematized plant to grow beyond the limit of the single foremanship plan, with the result that only the systematized plants could increase. The others were absorbed or ceased to be, and today there is probably not an unsystematized plant engaged in the manufacture of shoes. Indeed, some few shoe manufacturing concerns are developing scientific management very rapidly in all their departments. And what has happened to the shoe industry is now happening to other industries which are in the transitional period through which the shoe manufacturing industry passed twenty or twenty-five years ago.

The difficulty in the step from the systematized management to the scientific is not so much that of the personnel, as in the training of the personnel to work the new way, and especially in effecting the change in the mental attitude, which generally is a slow one. The qualities that mean success in the systematized management are just the ones needed in the other.

SCIENTIFIC MANAGEMENT

Those who have read the newspaper reports of the spectacular results accomplished in some instances by scientific management, without knowing how they occurred, have felt that there was some mystery about this new form of management which they did not understand. The feeling has prevailed that some method was used to drive the workman to superhuman effort, and that the management contributed little or nothing to this except the bait.

If you go through a certain shop, you see certain familiar machines, arranged in proper sequence and proportion, together with the store-rooms, drafting-rooms, and so on; you see sheet steel, rivets, etc., in different processes, until at the end the product is a boiler. In another shop you see similar machines, of different size, perhaps, arranged in different sequences and proportion, with drafting-rooms, store-rooms, and some different elements also, and the product is a ship.

Now there are very few, if any, new elements comprising scientific management; but a new combination, a different proportion, another sequence, the whole making a different form of organization.

Having described the phases of the other type, let us look at this. Let it be understood that scientific management cannot be complete until every functional part is working perfectly, for here is a whole plan, every part interlocking with the other, and interdependent.

1. *Accounting.*—Accounting under scientific management shows the manufacturing and expense accounts for the year, preferably by thirteen periods of four weeks each, rather than by twelve monthly periods; and at the expiration of each of these periods it shows the profit and loss, and assets and liabilities. These in the unsystematized plant are shown yearly, and not always in the systematized plant are they shown even monthly. Further, the group and unit costs of the various products, the cost and output of each department and all expenses which might be applied directly to the product, are shown in full, and the "comparative" features are much more useful in four-week periods because these give a more equal basis for comparison. A monthly statement as shown by the books in the systematized accounting does not give an accurate comparison because, for instance, some months will have five pay-rolls where others have four, and the number of working days varies considerably, because there may be five Sundays or five Saturday half-days.

In substance, the general accounts of the company are shown in more complete form every four-week period than is shown by the yearly accounting in the systematized class. The ledger accounts have absolute control over the stores department, over

the quantity and value of stores, work and materials in process and manufactured goods; and as every department and function of the manufacturing co-ordinates with every other, the accounting becomes a part of the very bone and fiber of the manufacturing.

One radical difference in point of view is that the ascertaining of costs does not have a special system installed for just that purpose, and the ascertaining of costs is not the end sought. Under scientific management costs come as a by-product of the means used for increasing efficiency. For instance, a ticket made up in the central planning department, when combined with the instruction card, serves to plan the work in advance; then it is used to control the order of work by being placed on a bulletin board; then it gives the workman his particular piece of work to do with the instructions how to do it. On this ticket is stamped the time at which the work is begun and the time when it ends. This same ticket then serves to check off the progress of the work on the route-sheet. Then it goes to the accounting department from which the man's pay is made up. It is then redistributed and furnishes the labor cost of the particular operation on the cost-sheet of the job. From cost-sheets similar to this are summarized not only the cost on all jobs, but department expenses and charges which appear in each four-week period statement. In other words, the mechanism used under systematized management for ascertaining costs performs little other work; under scientific management it has performed its part in producing work, and from it, as a by-product, so to speak, come the costs. The ascertaining of costs by this method is effected with but little more expense than is necessary for handling the regular work of operation.

Too much emphasis cannot be placed on the value of the comparative feature in accounting. Comparisons are a great spur to increased efficiency, and this fact is recognized as well in the systematized management. For example: a certain group of department stores, each doing a business in a different city and non-competitive, have found such good results from uniform accounting methods and the information that comes from comparison, that they jointly employ an accountant who collects the monthly reports in detail from these stores so as to make a compari-

son by items, and then prints these data for the use of the management of each store. Thus one manager finds that Department A in his store did $50,000 worth of business the preceding month, and had $35,000 worth of stock on hand; and he is shown in detail what the labor and other expense items of that department were. He sees that another store did $55,000 worth of business in Department A and had a stock of but $20,000. He immediately summons his buyer and informs him of the result of this comparison, and asks why he cannot do as well as the buyer in the other store and release $15,000 of capital now tied up in stock. The knowledge of what can be done and is done by the other store is often sufficient stimulus in itself to cause to be accomplished what otherwise would not be considered possible.

The expense and frequently the shutdowns for the purpose of the annual stock-taking are eliminated under scientific management, because the accounting absolutely controls the movement of materials in and out of the stores department. Its records therefore show at all times the amount in stores whence the value of the stores can be ascertained when desired. The work of proving the items of stores is done continuously, and the days, which often become weeks and months, that elapse before even large and well-organized concerns get the results of their stock-taking, become a thing of the past. One large concern with which I am acquainted finished its year of stock-taking January 1, and it was early in August of that year before it got the results and knew how much stock it had on hand January 1. The same will apply to the amount of materials and labor in process, which the systematized management finds it even a harder problem to handle, and also to the value of manufactured goods.

2. *Purchasing.*—Scientific management is not satisfied merely to have plenty of materials on hand when wanted, to standardize roughly the principal items of stock used and to buy at the market rate, but demands that all materials be carefully studied with reference to—

First, The greatest adaptability to the work.

Second, Quality and uniformity.

Third, Price.

Fourth, Determination of the proper maximum and minimum amount that shall be carried, so that the stores department may automatically control materials and supplies which should always be on hand.

When this has been accomplished, care is taken to make all purchases on detailed specifications. The importance of using the materials which are best suited to the work, of maintaining uniformity of quality and of reducing the number of necessary materials to a minimum by standardization, is not sufficiently appreciated by the buyer in even the systematized plant. For example, a manufacturer of razors using a thin blade could not secure a steel which would always act in the same way and produce a uniform result with uniform treatment. He employed a steel expert of reputation to assist him. This expert purchased the best razors that different barbers had, analyzed them chemically and microscopically and, as every man who uses a razor might guess, found very great variation even in the same makes. In fact, he satisfied himself that no razor manufacturer, however well-systematized his plant was, had ever scientifically determined the best steel or purchased it on a formula that would standardize this material. As a result, all these years the buying of a razor had been a lottery. After many tests this expert secured from various steel manufacturers samples of steel on their formulae and his own, and he finally developed a formula that would give the best razor steel known and maintain it uniform. In consequence of this method of buying this manufacturer stood alone among the razor producers of the country in ability to produce razor blades of standard quality. If all his methods are as scientific as this, it is doubtful whether his competitors will ever overtake the lead he has secured. This is not an extreme example by any means.

Take another illustration of the standardizing of materials. In studying the supplies of a business it was found that twelve kinds of wrapping paper were in regular use and that an investment of $2,500 was needed to carry a sufficient amount. By standardization the twelve kinds of paper have now been reduced to four, with a saving of $1,000 in the stock, and of 60 per cent in the storage space occupied. Moveover, the available worth of this

paper for the demands that may be made on it is 20 per cent more than it was formerly. This illustrates the saving made on but one class of material used in a factory where standardization is being worked out.

Such methods of purchasing compel the purchasing department to be intimately associated with the working of the materials through manufacture, and lead to the following results:

First. Uniform material best adapted to the work, saving labor and delay in workrooms.

Second. A minimum of kinds and sizes necessarily carried.

Third. Storage space saved.

Fourth. Lower costs through buying in larger lots.

3. *Storage of materials.*—In its physical aspects a storeroom under scientific management does not differ greatly from one that is systematized. A proper means of holding or piling the stores, laid out in an orderly fashion, is provided. To avoid confusion in a varied terminology, mnemonic symbols are used to designate the different kinds of stores. The maximum and minimum quantities mentioned above are determined for each kind, and kept on the ledger sheets in the central planning room. The book-keeping for the stores is not carried on in the storeroom. The storeroom force acts only on receipt of written order. The location of the materials is also indicated on the ledger sheets, or, as they are sometimes known, the balance of stores sheets.

The storeroom in the systematized plant does not ordinarily provide for all the materials and supplies used in the entire plant. The engine-room, plumbing and construction supplies may be carried in places provided for them, but not under proper control. Stationery and office forms and supplies may be carried somewhere else, under a different system, or with no system. Even in well-systematized plants such items as are not considered a part of the general stores system cause more or less trouble by being used up unexpectedly.

Under scientific management it is not sufficient, when materials are required, to send a requisition to the stores department. Instead, all orders or work which require material have the items looked up and assigned to the specific orders by stores clerks, and

this material when assigned to a given order is not available for another order which may follow. This is done before the materials are required for use, and this method serves as advance warning to the stores clerks if an unexpected demand for a particular material is likely to occur. Quick action is then possible in purchasing more.

The work of moving materials into the stores department and moving them from the stores department to the particular place where they are to be used, becomes a function of the planning and routing of the work, and the workman who is to use them should not be delayed or have to give a thought to the materials which he needs for his next job. They are moved in the right condition for his use to the point where he can use them to the best advantage. The time which the workman spends looking for or waiting for his materials can be better spent in effective work. The proper working of the stores department in many industries, and especially in mercantile establishments, is very important.

4. *Execution of work.*—The theory of the proper execution of work is that it should be planned completely before a single move is made—that a route-sheet which will show the names and order of all the operations which are to be performed should be made out and that instruction cards should be clearly written for each operation. Requisitions on the stores department showing the kind and quality of the materials and where they should be moved, and lists of proper tools for doing the work in the best way, should be made up for each operation. Then, by time-study the very best method and apparatus for performing each operation is determined in advance, and becomes a part of the instruction cards.

By this means the order and assignment of all work, or routing as it is called, should be conducted by the central planning or routing department. This brings the control of all operations in the plant, the progress and order of the work, back to the central point. Information which even in the systematized plant is supposed to be furnished by the knowledge of the workman or the gang-boss or foreman, is brought back to the planning room and becomes a part of the instruction card.

In systematized plants generally no attempt is made to change

the method by which the workman performs his operations. Plenty of time and money may be spent on special machinery, but when that is installed very little time is spent in a close analytical study of the time elements and motions involved in operating, in order to make it possible for the workman to work in the easiest and best way and to furnish a fair basis of remuneration.

When the analytical study has been made, the probable time of operation determined, and a sufficient incentive has been added in the shape of a bonus for performing the work in the given time and in the way specified, then work can be much more accurately controlled from the central planning room because it is likely to be done in approximately the time determined and without lagging.

By *functional foremanship*, the management brings to bear on each phase of the work the abilities of a man particularly fitted by selection, training and experience to assist in performing that part of the work. His duty is to assist the worker and co-operate with him to enable him to increase his earning capacity by eliminating trouble or delays or wrong methods. Even in the well-managed systematized plant the manager will tell you that the weak point in his business is the inability to secure good foremen, or good superintendents. He demands:

First. That a foreman shall know all about the work which is done in his department.

Second. That he be a good disciplinarian.

Third. That he have the ability to crowd work through and get it out quickly.

Fourth. That he be cautious and accurate.

Fifth. That he be able to keep account of innumerable details.

To find all these qualities combined successfully in one man is exceedingly difficult, to train such men is also difficult, and to secure them by natural selection and "survival of the fittest" takes too long; but to train men for functional foremanship by selecting the man best fitted to do the particular function and then training him in that, is simply one kind of division of labor which has marked the progress of civilization.

The execution of work which is largely repetition, where the individual processes are simple, reaches a very high efficiency in

many systematized plants. The difficulties in securing efficiency increase as the work becomes more varied and with less proportion of it repeat-work, and in proportion as these difficulties increase ordinary systems fail to produce results in more intricate work. Results can be attained, however, by the central planning room from the analysis and time-study which is put into all operations of work and reduced to instruction cards.

5. *Efficiency of the worker.*—In many simple operations in manufacturing, piece-work has always been considered the most efficient method of securing output and low costs, and it is true that where the remuneration is a just one and when the employee is supplied with proper materials and works to the best advantage, this method of performing work approaches very closely to that of scientific management; but such conditions of piece-work are the ideal rather than the usual. As before stated, piece-work with prices based on the snap judgment of a foreman or by an imperfect test of a single worker, is not the correct method to secure the best efficiency or the fairest remuneration to the worker. Besides, there are many kinds of work which are not adapted to piece-work. Under scientific management the efficiency of the worker and machine depends on five other conditions, after assuming that the parts of the management which have to do with purchasing, storage of materials, etc., are well performed. These conditions are:

First. Analysis and synthesis of the elements of operation.

Second. Scientific selection of the worker.

Third. Training of the worker.

Fourth. Proper tools and equipment.

Fifth. Proper incentive. All these conditions it is the duty of the management to provide.

First. The first condition on which the efficiency of the worker depends is that *the management shall analyze carefully and thoroughly every operation into its ultimate elements;* shall then recombine those elements in their proper sequence, eliminating those which are unnecessary or those which are bad, and reducing the form to a written instruction card for the worker to follow; the time elements having been determined and becoming a part of the instruction card. It is interesting to see what develops when one really begins

to study a seemingly simple operation. The motion-study alone of brick-laying makes possible the elimination of sixteen unnecessary motions.

One factory doing light manufacturing has lately put some time into studying what have always been considered simple operations. In certain places a differently shaped receptacle was made for the articles on which work was being done, bringing the pieces within six inches of the left hand, whereas for years before the worker had had to reach for these and occasionally stop work to bring the articles farthest away within reach with a sort of hoe. Other operations in this plant have been simplified by changing the position of some workers so that the porter who supplies materials can do so without interrupting and causing a stop in the work several times a day. A study of extra steps and little delays by an intelligent observer is a necessary work before the greatest efficiency can be secured. When all these analyses have been reduced to writing, a study of the type of man best fitted to do this work is made.

Second. This leads to the second heading. The type of worker who physically and mentally is best fitted to do a given kind of work must be selected after a careful study of that class of operations, made with reference to the physiological and mental differences in human beings. The difference in output and quality of work has been found to vary as much as 40 per cent or 50 per cent in a group of men or women engaged on the same kind of work. As these persons were of apparently equal intelligence and education, the diverse results could be explained only by physiological and mental differences. As a result of time-study and motion-study of various groups of operations in one large manufacturing plant, it has been found that there are so many workers performing a kind of work to which they are not suited, but who might excel in another kind of work, that the management has laid plans to establish classes to instruct workers to do another kind of work better adapted to their capacities. In fact, when a study was made of two small groups of workers, it was found that over twenty per cent of each group could not successfully compete with their fellow workers in the same group, but were well fitted

to earn just as much in another group, and a change was made to the benefit of all concerned.

The laws governing the appeal of advertising have recently been explained by the application of psychology. The laws of fitness—mental, nervous and physical adaptation to occupation—are still a great field for research. Teachers in the vocational schools cannot perform their true functions until they come to a better knowledge of the demands of each occupation upon one's nervous, mental or physical being, and until they have some method of observation or test by which they can divert their pupils from entering these occupations in which they will clearly be a misfit. The late French psychologist, Binet, was able by tests to ascertain with apparent certainty, in a very few minutes, whether a child was mentally alert or not. Several applications of the Binet tests have already been made in this country.

Is it unreasonable to hope that some experimental psychologist may see the great aid work of this kind might be, if only carried on to help differentiate the mentally alert and to make tests of this kind practical? Scientific selection of the workmen is but a part; the scientific selection of *foremen*, of *superintendents and managers is just as important.* How frequently one sees a man struggling with the details of an office or with the wear and tear of executive work, on the verge of nervous prostration, when that man is wholly unfitted for that kind of work and his attempts successfully to perform it result in his undoing. If managers themselves knew how to judge a man's fitness for his work and were more observing, there would be far fewer breakdowns and physical wrecks than there are now.

Third. Having first carried out the study of the operation which has pointed the way to the proper selection of the worker, it becomes a duty to train the worker to do the work in the way which the result of the analysis has shown to be the best way. This will be accomplished by a functional foreman whose task is to train the workmen and help them to start right on each job. If they fail to do the task in the time fixed it is the duty of of the functional foreman to find out why they have failed, and to help them do the work as it should have been done. This is a

wide departure from the old school, which assumes that the journeyman has sufficient knowledge to do his own work in the most efficient manner. In the training of workmen it is interesting to see how they develop through an aroused interest and the co-operation of those over them.

The training of the adult worker is a condition that faces us now, but we should not be slow to realize that the boy is father to the man. The lack of trade schools to give thorough training in the manual arts and trades, must be met by the far-sighted manufacturer. This he should do by helping promote such excellent ideas in technical training as those originated by the University of Cincinnati, and other good school systems so that they may be within the reach of all He should do it also by carefully worked out apprenticeship methods, and the many other helps such as class work that one can give the young worker. This can often be carried on in dull times with little additional expense.

Fourth. The fourth condition is that the worker be supplied with the best tools and just the ones needed for the particular operation, and supplied when needed; that he be given the best machine, maintained in first-class condition, so that machine, belt and tool failures will be reduced to the minimum. Any special tools or special fittings required for a job should be determined beforehand and should be within reach as wanted. To maintain machinery and provide such tools is the duty of the management. Scientific management provides the means with which to do this.

Fifth. Sufficient incentive should be given the worker to perform in the given time the operation or the task that has been set. The functional foreman trained to his specialty will do this more effectively than the old-fashioned all-around foreman. Many examples have been given of relative increase in efficiency of the worker as a result of scientific management. Of course such relative increases in output cannot be considered universal. Certain machines are not mechanically able to run at double or triple their former speeds, but scientific management tends to lessen the numberless little delays which the condition of the machine, the state of the material to be worked upon, or the instructions to the worker, may have been responsible for.

It must be to the financial interest of the worker to be industrious, and it has been shown to be for the interest of the management to do everything to make possible and profitable this increased industry of the worker, thereby gaining a more uniform output, and an output per man or machine which is maintained more steadily in dull or busy times.

There is another feature which is of interest; that is, if the worker engaged on the task and bonus does not receive his materials promptly and on time, if his machine is not in the condition it should be, or there are other avoidable delays, the worker has sufficient interest in the probable loss of his bonus to make a serious protest, and it is the duty of the gang-boss to right this trouble immediately. Therefore, the workman and the boss are together demanding of the management that as nearly as possible perfect working conditions be maintained.

CONCLUSION

The central planning and control of work which is such a vital part in scientific management is not developed to the same degree in the systematized. In such plants where complete planning is attempted, however, the instructions and orders particularize *what* is to be done rather than *how* it is to be done.

In the systematized plant the system in one department has been planned especially for that department, and is not a part of the system framework which pervades the whole, as in scientific management, and it is a constant fight to maintain such independent systems and especially to change and modify them with changed conditions or the increased growth of the business.

In closing let us see the effects of this type of management in general on the plant, the product, the worker and the management.

Plant.—Scientific management furnishes the machinery for maintaining the plant in better condition by centralizing the control, by the use of such devices as the standing order file in which are collected and reduced to writing and properly indexed the practices and rules of the company. From it, by listing and making a certain program of things to be done—the departments, machinery, and shafting, to be overhauled, drains, gutters, etc., to be inspected—this program can be handled month after month

by routine in a manner which the management has carefully predetermined. To attend to the maintenance of a plant in this way is working to prevent delay and expense rather than to cure it afterwards. For instance, eliminating delays due to belt failures, shaft-boxes which have been overlooked and run dry, and indefinite inspection of premises, pipe lines, traps, etc., tends to save expense by preventing trouble.

Product.—The product of such a scientifically managed plant should be and is more uniform, and there should be fewer mistakes and less inferior work. Organized inspection is a part of the plan. Once a standard is set for each operation, that standard can be maintained. It costs little more to maintain a high standard under these conditions than a low one under old conditions.

The worker.—The condition of a worker's mind has a very large effect on his physical being. There is a psychological effect on a worker in having the work divided into definite tasks, each one having its goal in sight and sustaining effort to that time. The piece-workers in a plant in which I am interested were once interviewed by a woman journalist who asked them how they liked the task and bonus. They said they didn't know why it was, but they liked it; they were earning more. But that was not all: the piece-work flowing to them in an unending stream had been discouraging; there was something they could not understand, but when it was broken up into definite lots they liked it much better. You can discourage any man by setting him to work with a pick and shovel and telling him to shovel away a hill. He knows he can never get it done, but if you say: "Here, you shovel so many tip-carts full in a day, or in a given time, and you shall have a certain percentage of increase of pay for that time," you have changed the point of view, and that man every time he finishes a tip-cart full has accomplished a definite task. His effort is sustained for that time, and he is going to be able to sustain that effort in the future. That is one reason why profit-sharing among the working classes is almost an absolute failure so far as increased efficiency is concerned; the time of sustained effort for a year or six months is too long. Neither can a worker do his best work who is nagged by a foreman, who has been given insufficient instructions and is fearful lest he is doing his work wrong, and who, having made a mistake,

is jumped on, oftentimes perhaps unjustly. He is not in a frame of mind to do his best work if he wishes to.

In one factory there was great difficulty in keeping the women workers in a certain department. Either they were unwilling to continue to work or frequently they gave out, and it was a puzzle for some time to find out what the trouble was. When the analysis and time-study were put into this department, it was found that part of the trouble was due to the fact that they were not earning so much as workers in adjacent departments, that they were nagged by the foreman, who did not understand how to handle help, and that they were working at a disadvantage in the arrangement of their work places. The first step was to fit up their places so they could work to the best advantage. A time-study then showed that by working according to instructions they could easily do 50 per cent more work. To insure the work being well done, one of the best girls was selected as an inspector and given charge of their work, the foreman having nothing to do with them. A few of the girls were tried on the extra work, working under the constant instruction of the time-study man and being paid an additional amount. All the girls who were physically fitted for this kind of work tried the extra amount, which they did easily. The result of the extra pay, freedom from the nagging of the foreman, and easier working conditions, immediately stopped the difficulty in keeping workers in this department. One or two of these workers, according to the report of the factory nurse, have gained weight since this change was made.

After this policy had been in effect for a while, the constant request of one girl that she be allowed to undertake one-third more work, or double the original amount, was granted with the approval of the factory nurse, who watched her closely. This was a task not set by time-study, but one which the girl herself thought she could undertake. She found, however, that it was too much and gave it up voluntarily, but she is still doing 50 per cent more work than she originally did. She is a girl well fitted for the kind of work and for her a larger task could be given, but tasks are set with the idea of the average worker who is first selected for the particular kind of work.

It must be considered that the effect of task and bonus work

under the proper conditions tends to greater industry, better discipline, a happier disposition and greater interest in work on the part of the workers. Greater regularity, greater accuracy and neatness must and do have an influence on health and character.

Management.—It is probable that the point of view of heads of departments and those responsible for the management becomes quite as much changed as that of the workers. When mistakes are made the responsibility is fixed and the management cannot dodge the fact. A manager also realizes as never before the value that must be placed on analysis. As Mr. Taylor once said: "Thought under scientific management is 75 per cent analysis and 25 per cent common sense."

When a seemingly difficult operation has been analyzed to its last detail, it is not so difficult to reconstruct it on the proper lines. There is, too, an added interest to the management in the feeling that it is working on a plan, the underlying principles of which are already determined, and the details of which are to be developed in accordance with those principles more and more finely as years go by.

Beneath all this there is a good deal of philosophy. It seems to me that this is the best solution of a fair compensation for labor because it puts a premium on the efficiency of both employees and employer, and the success of scientific management depends upon this close co-operation of employer and employee. Along some such line it seems to me will sooner or later be worked out the great problems of labor and capital.

No claim can be laid to this as a panacea for labor troubles, nor a cure for all the mistakes and errors and ills that are contingent on human frailty. There does come a better understanding between management, foremen and workers, and more responsibility is placed on the management than ever before. Without this co-operation, this interlocking of interests, scientific management is but a word.

It is hoped that what has been said may have served to state the question, and to make a little more clear in their true proportions the underlying principles of what we call scientific management.

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UNITS, METHODS, AND DEVICES OF MEASUREMENT UNDER SCIENTIFIC MANAGEMENT

In any paper covering a subject of such scope as this, one can hope to do little more than outline the subject, but even for such an outline it is necessary to show at the outset the scheme of division, recognition, and interrelation of the functions of scientific management.

This can be done best by showing graphically two plans of management. The first of these (see Fig. 1) represents what is variously known as military or traditional management. Here each man is responsible to one man only above him, and is in charge of all those below him. Thus it is the custom for any man to come in contact with one man above him only, the line of authority being single and direct. Traditional management has been used for centuries in military organizations, and has also been used many times in religious organizations and political organizations. The division is by men, by grades of men, rather than by functions.

Because the division is by men, it is almost impossible to measure and standardize the duties of the positions. Any attempt at such measurement and standardization makes clear the fact that the requirements of every position, with the exception of the most subordinate, demand men of a higher grade of development than the pay involved would justify. Moreover, as the supposed requirements of the positions are the result of guess or tradition rather than of measurement, successful standardization would be not only impracticable, but impossible.

Fig. 2 represents the lines of authority in functional or scientific management, or what would be called, but for objections of Dr. Taylor, the Taylor system of management. Here the division is by functions, the first functional division being the separation of the planning from the performing. Graphically, this separation is represented by the horizontal line. All functions above this line are of the planning, all functions below this line are of the performing. Note the functions shown on this chart, namely, four functions in

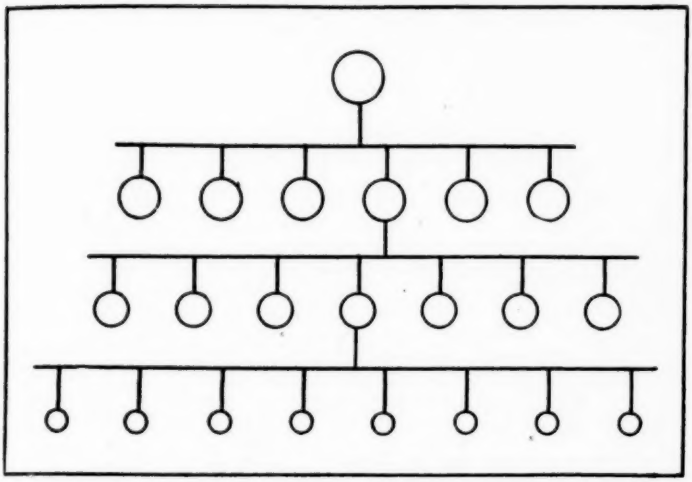

FIG. 1.—Diagram illustrating the routes of authority under the traditional or military type of management

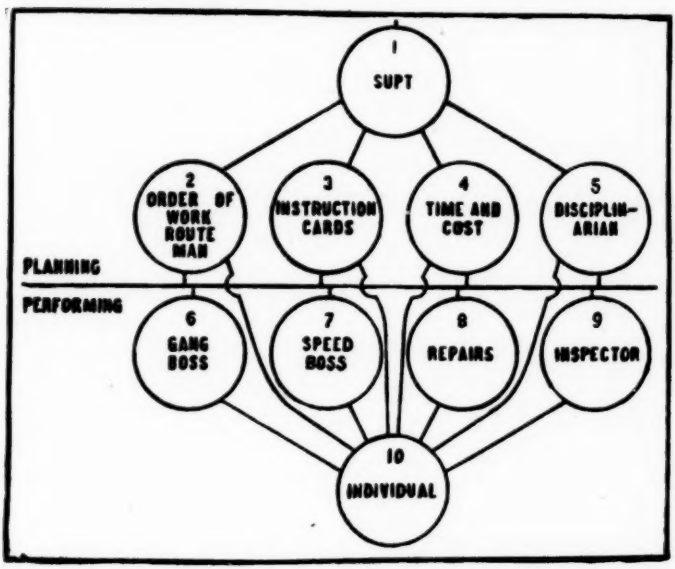

FIG. 2.—Diagram illustrating the principle of functional or scientific management

the planning and four functions in the performing. Note also their relation to each other, and to the individual worker. This chart shows one such worker represented by the lowest circle. There should be no objection to representing each individual worker by such a circle, but the relation of each such worker to those over him is the same. Hence, the lowest circle is typical.

It will be noted that the worker receives orders directly from eight different foremen. One might suggest, on observing this, that it has often been said that no man can serve two masters. This holds good today, even in scientific management. But under scientific management the worker does not "serve eight masters" nor eight functional foremen, but, on the other hand, he receives help from eight different foremen or teachers. In this way, his case is not very different from that of the student who receives instruction from eight different professors, in eight different studies.

The four functions in the planning department are represented by (2) route man and order-of-work man; (3) instruction cards; (4) time and cost; (5) disciplinarian. While we speak of each function as being represented by one person, as a matter of fact each function may include any number of individuals, according to the kind of work, and the number necessary so to perform that function as to eliminate all possible waste. Each one of these four men of the four functions in the planning department is supreme in his respective function. All deal directly with the worker, and all deal directly with the four functional foremen who are in the performing department.

Of the *performing* department we have four functions represented by (7) gang boss; (8) speed boss; (9) repair boss; (10) inspector. These functions, like those of the planning department, are represented by as many men as the nature and amount of work justifies. All such representatives deal, as the chart indicates, directly both with all individuals in the planning department, and with each individual worker.

The fact that all divisions represented by this chart are made on the basis of the nature of the work that is to be done, makes possible units for measuring and standardizing the duties of the man or men who hold the positions. The determining, grouping,

and assigning of these duties is done by measurement; hence the resultant standardization is successful. A statement of the duties of each function will make clear the amount of standardization that is possible.

Route man.—The duty of the route man (function No. 2) is to determine and plan in advance the path of each piece of material, worked and unworked, as it passes through the shop or as it is handled by each and every member of the organization who has anything to do with it. He is to decide the three dimensions of the path, and the route that the material is to pass through, whether it is to go to the stores or into temporary storage stations, or directly through the shop as fast as the operations connected with it will permit. His function is not simply to look after the details of the moving; he must also determine the "when" and in many cases the "who" as well as the "where." Broadly, he determines the entire transportation career of the material. For example, in building operations, he would determine where the car was to be placed to be unloaded, where the material was to be unloaded, when it was to be moved into the building, and exactly what path it should follow across the floor, up elevators and to its final resting-place, and *who* should perform each operation.

Often the route man is able to simplify greatly the path of the materials, especially on large orders, by a rearrangement or routing of the machinery. We have had one case in our experience where it was cheaper, in a woodworking shop, to have the machinery placed on heavy pieces not attached to the floor, each machine operated by an individual motor, and to move the machinery, in order to accommodate the peculiarities of sequence of events of each particular order, when the order was large enough to warrant moving the machinery. The route man's duties, also, oftentimes involve determining a new path, ordering that machinery not used be removed, so that he can route his material by a more economical method. After he has determined the exact path by which the material shall be routed, he embodies his conclusions into process charts, route charts, and route sheets; these illustrate his orders graphically and chronologically and are worked out in detail by the instruction card department.

Instruction cards.—It must not be supposed that the instruction-card function consists merely in the work of writing out the instruction cards. This is the name of the function in general, and it may be performed by several men in different lines and of varying capacity in the instruction-card function; that is to say, the department or function may be divided into measurable units or subfunctions. It is the duty of the instruction-card function to work out in detail and to devise and construct an instruction card describing the method of least waste for each element of the route sheets which are made from the route charts. The instruction-card department furnishes in the greatest possible detail such directions as will show two different classes of men their duties, namely: (*a*) the worker, who must know how to perform the particular work shown on the instruction card; and (*b*) the functional foremen in the performing department, who must know exactly what they are to see that the worker does perform, and exactly what they are to teach the worker in order that he may so perform his work as to conform to the instruction card.

Time and cost.—After the worker has performed his work, a return of the time that it took him to do his work, together with its cost, goes to the time and cost clerk (function No. 4) who calculates the pay-roll, including the bonuses, and the costs of each piece of subdivision of the work.

Disciplinarian.—The disciplinarian is the man who handles all matters in the entire organization pertaining to discipline. He must be a broad-gauge man, who is able to keep peace in the organization, to anticipate and prevent many disagreements and misunderstandings before they actually occur, and to arbitrate or judge fairly such disagreements as do take place.

The functions in the performing department are now to be considered.

Gang boss.—Function No. 7 is that of the teacher, still called "gang boss," as it was from that function that his work evolved. There may be many gang bosses in the performing department; in fact there are frequently five or more gang bosses of a single trade, with an over-gang-boss in charge. Altogether there may be in this function gang bosses of twenty or thirty different trades, in fact of

as many trades as are at work; or, possibly, one gang boss might look after two or more trades. The gang boss under scientific management is not the "strong arm" type of man represented by the mate of the vessel of former days, who boasted that he could thrash any man in the entire crew, and often did so for no other reason than to prove his words. Instead he is a man who knows of the measuring methods of motion-study and time-study, and who can teach the worker the methods shown on the instruction card. In order to get his best work, and to enlist his zeal, it is usually necessary to pay him a bonus measured by the bonus paid each and every man under him who in turn earns his bonus; and a double bonus if every man in his gang earns the bonus. For example suppose the gang boss received $3.00 per day, and had twenty men working under him, he would be paid, say, in round numbers, 10 cents a piece for each man under him who received his bonus; and, if all twenty of the men received their bonus, he would receive a double bonus of 20 cents apiece for the entire gang.

It can readily be seen that such a plan of management as this will bring out co-operation as would no other plan; and it should be stated here emphatically that there is nothing that can permanently bring about results from scientific management, and the economies that it is possible to effect by it, unless the organization is supported by the hearty co-operation of the men. Without this there is no scientific management.

Moreover, since the conditions which bring about the co-operation are measured and standardized, the result is stable. Co-operation without standardization is a most unstable thing, likely to disappear at any moment with a change of the individuals supposed to co-operate.

Speed boss.—Regardless of the popular impression as to his duties, the speed boss (function No. 8) does not speed up the men. In fact, he has very little to do with speeding the men. His duty is to see that the machinery moves at the exact speed called for on the individual instruction card. It is obvious that there is some one speed that is more desirable than any other speed; for example, the speed of a buzz planer or a circular saw is very dangerous when it is too slow, while on the other hand, the speed of a fly-wheel of an

engine is very dangerous when it is too fast. What is most desirable and safe is the speed that the instruction card man attempts to set on the instruction card, and it is the duty of the speed boss to see that the machinery runs at all times at exactly the prescribed speeds. He not only shows the worker how he can make his machine run at the speed called for, but, if there is a question as to its being possible to run at this speed, he must be prepared to teach the worker by doing the work himself, or provide a man who can comply with the requirements of the instruction card.

Repair boss.—Function No. 9 is that of the repair boss. His duties consist principally in seeing that all machines are kept clean and in proper condition, and in carrying out repairs and overhaulings, such as are called for on instruction cards and in standing orders that are given to him at regular, predetermined intervals. In this way breakdowns are so far as possible avoided. The repair boss, however, must be a resourceful man, prepared, in case of emergency, to jump in and repair any such breakdowns as may occur, even in the absence of precise directions or of instruction-card specifications.

Inspector.—Function No. 10 is that of the inspector. His duties are decidedly different from those of the inspector under the old type of management. For example, his inspection must result in prevention of error; in constructive criticism, not destructive criticism. His decisions are predetermined by measurable limits of error furnished both him and the workman by the instruction-card department.

Many times, under traditional management, the inspector comes around after the work is done, condemns it, and walks away, leaving it to others to see that the work is replaced to his satisfaction. Under scientific management the inspector is required to stand near the worker when he is handling a new piece of work for the first time, in order to see that the worker thoroughly understands his work as it progresses. Thus the first unit of the material is less likely to be spoiled. If the worker has a task of, say, fifty pieces, the inspector inspects the first piece most carefully, to make sure that the worker knows exactly what he is to do, how he is to do it,

and the quality and the prescribed tolerances of drawing and instruction card.

The workman.—As for the individual worker, it will be seen that he does not receive merely an instruction card, telling him by units what he is to do, how he is to do it, how fast he is expected to do it, the prescribed quality of the work which must be done, and how much pay over and above his usual day's wages he will surely get if he does all that is called for on his instruction card. He receives also personal teaching. The gang boss acts as his teacher constantly; the speed boss he can call on at all times to assist him with the speeds; the repair boss co-operates with him to see that his machine is constantly kept in such repair that he can earn his bonus, and the inspector will also teach him at any time, and show him wherein he is making a deviation from the quality called for. Moreover, the functional foremen in the planning department are ready, at call, to explain their instructions. Thus he has every help that is possible, to enable him to earn the exceptionally high wages that are offered by this form of management. He is assured of the "square deal" from the foremen who are over him, and in case others whose work affects his are deviating from their measurable schedules, programs, or conduct, he always has the same opportunity to appeal to the disciplinarian, that a foreman would have in case the worker was not doing his work as well as he could do it, or was not trying to co-operate with the other workers.

Having described briefly some of the many divisions and interrelations of the functions of scientific management and their foundation upon measurement, we are now ready to concentrate upon one, to show by a typical case how division of elements down to fundamental units may result in (*a*) determined units; (*b*) measured units; (*c*) devices of measurement. Let us take for a typical example two subfunctions of the instruction-card function, namely, motion-study and time-study, and carry them to micromotion-study.

Motion-study is a subfunction of function No. 3 of the planning department. Just as scientific management is divided into functions, so each function is divided into subfunctions, the basis of division being the same, i.e., duties, not men (see Fig. 3). Motion-

study is related to all subfunctions of the instruction-card function, but is most closely related to time-study and to the determining of methods of least waste. It is related to time-study in that it determines what path a motion is to follow, while time-study determines how swiftly the path is to be traversed and the amount of rest

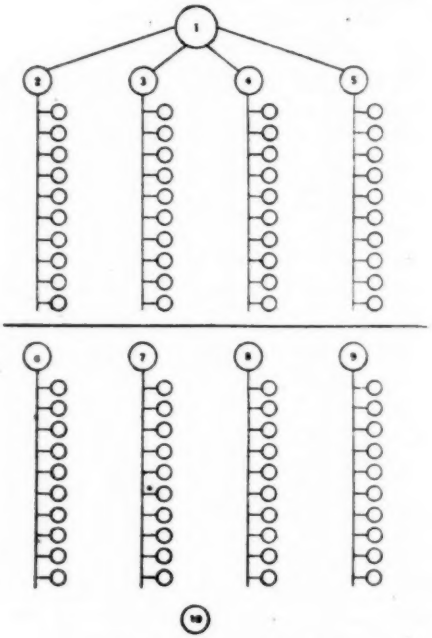

FIG. 3.—The subfunctional chart

required to overcome resulting fatigue. The two measure work and determine the best method by which the work can be done.

Motion-study, time-study, micromotion-study, fatigue-study, and cost-study are important measures of scientific management, by which the efficiency of each function and subfunction is determined, tested, and checked. The unit to be chosen for intensive study is determined by the amount of time and money that it is possible to save by the investigation. This unit is determined by the following

method. The work selected is divided into natural subdivisions or cycles of performance. Each cycle is then subjected to motion study, to determine the best method to use in performing the work. This method is divided into the smallest practicable units. These units are timed. The timed units are then again subjected to motion study, for more intensive study of method. Subdivided motions result. These are again timed, and so the process proceeds until the further possible saving will no longer warrant further study, or the available appropriation of time or money is exhausted. The most efficient motions, as determined by the tests of motion-study and time-study, are then synthesized into a method of least-known waste.

This outline of the steps in taking motion-study and time-study is necessarily incomplete, lacking, as it does, discussion of the selection of the observer, the observed worker, and many other elements of scientific management.

As for the particular device by which the measurements are made, the choice depends mainly on the equipment available. Standards have been improved even by merely timing the work by counting, where no timing devices were at hand. Excellent work had been done with stop watches. But we advocate the use of micromotion-study in all work demanding precision. Micromotion-study consists in recording the speed simultaneously with a two or three dimensional path of motions by the aid of cinematograph pictures of a worker at work and a specially designed clock that shows divisions of time so minute as to indicate a different time of day in each picture in the cinematograph film. Through micromotion-study not only is the measurement more accurate than it could possibly be through any other method, but also the records are so complete, permanent, and accessible that they may be studied at any time and place by anyone. The advantages of this in standardizing work, and most especially in teaching workers, are obvious.

The result of measurement, as outlined above, is standards synthesized from measured ultimate units of the workers' manual motions.

Morris Llewellyn Cooke, Director of the Philadelphia Depart-

ment of Public Works, in *Bulletin 5* of the Carnegie Foundation for the Advancement of Teaching, created for the word "standard" a definition which is itself "standard" in the scientific management sense. He said:

> A standard under modern scientific management is simply a carefully thought-out method of performing a function, or carefully drawn specifications covering an implement or some article of stores or of product. The idea of perfection is not involved in standardization. The standard method of doing anything is simply the best method that can be devised at the time the standard is drawn. Standard specifications for materials simply cover all the points of possible variation which it is possible to cover at the time the specifications are drawn. Improvements in standards are wanted and adopted whenever and wherever they are found. There is absolutely nothing in standardization to preclude innovation. But to protect standards from changes which are not in the direction of improvement, certain safeguards are erected. These safeguards protect standards from change for the sake of change. All that is demanded under modern scientific management is that a proposed change in a standard must be scrutinized as carefully as the standard was scrutinized prior to its adoption, and further that this work be done by experts as competent to do it as were those who originally framed the standard. Standards adopted and protected in this way produce the best that is known at any one time. Standardization practiced in this way is a constant invitation to experimentation and improvement.

This experimentation and improvement are done by time and motion study *before* the standards are made. Thus the resulting standard is in so far perfected that only the invention of a new device will make a change in the standard necessary. The fact that such devices are often the result of the motion study also assists in making the standards that are incorporated from the completed study more permanent.

As was well shown by Mr. John G. Aldrich, in a paper read before the American Society of Mechanical Engineers, in December, 1912, the waste motions eliminated by such measured standardizing can scarcely be overestimated. This has been demonstrated in many lines of activity. The standard toolroom, the standard assembly packet and bench for assembling, the standard desk in the planning department—these are but illustrations of the application of this principle. And it is not necessary that the illustrations be drawn from the field of shopwork. It has been applied to many of

the outdoor trades. We are now co-operating with famous surgeons in the study of the elementary motions used in surgery, and we are investigating the muscular activity that underlies the "singing tone" of the skilled musician, to mention two recent invasions of the fields of science and art.

There will be those who will say that no such theory, methods, or devices can ever supplant the need and usefulness of the first-class mechanic or the genius in the trades, arts, and professions. With this we humbly agree. But even two geniuses in the same work may differ greatly in their methods as a whole; and isolating and examining the ultimate units of their work may show that motions made by one of the geniuses may be found absent, and unnecessary, in the work of the other. A synthesis of the best of the units of methods of each would present a method better than any arrived at by the spontaneity of any one genius, no matter how great. Surely the presentation of the best method, however discovered, must be of the greatest value to all below the grade of best.

Meantime, all workers are sharing in the savings made possible by the elimination of waste. They are being trained in habits of least wasteful motions, and are becoming more efficient both in their working and in their non-working hours. They learn to "think in elementary motions," and to submit their activities in all lines to the tests of motion and time study.

The great need now is for more efficient co-operation, that work done by one investigator may not be needlessly repeated by another. Through such co-operation only can come the savings that will allow of refinements of the units, methods, and devices of measurement, and that will result in progress that is definite, constant, and lasting.

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THE RELATION OF SCIENTIFIC MANAGEMENT TO THE WAGE PROBLEM

That the Taylor system of scientific management has made good with manufacturers and employers who know, cannot now in the light of recent history be gainsaid. The sworn testimony of manufacturers before the Congressional Committee on Labor "appointed to investigate the Taylor and other systems of management" is conclusive on this score. The report of the chief of ordnance for 1912 with reference to the working of the system in government arsenals is an illuminating and informing document from an unprejudiced source, which settles the question at least so far as machine-shops are concerned. The application of scientific management to other branches of industry has been spreading widely, not only in this country but abroad in Europe and Japan, and always with the same satisfactory results. In spite of the popular confusion of ideas about what scientific management is and the frequent mistaking of various other "systems" for the Taylor system, the success of the latter in its complete applications is now indisputable, and well-informed managers are aware of that fact.

It is not surprising, however, that the mass of laboring men are as a whole quite uninformed and misinformed on the subject. Men who work in plants organized according to the Taylor system know the facts and are quite willing to admit its success from their point of view. But the majority of working-men have never seen such plants, and in all frankness it must be said that they have been consistently and persistently misinformed, especially by some of their trade-union leaders, in regard to the effect of the system upon the health and wages of the men. This propaganda of misinformation is but a variation of the warfare with which the introduction of machinery was met, and it is likely to have the same effect of retarding the further development of scientific management, unless counteracted by a propaganda of facts. A campaign of education of the working-men is necessary and, if

long enough continued, is bound to be effective. Such a campaign, however, must itself be based upon facts; and in this paper I hope to show the bearing of the Taylor system on the "wage problem."

Of the trinity of materials, machinery, and men that constitutes factory organization, the most important factor is men. Though everyone recognizes this truth, very few have in the past acted upon it. A great deal of attention has been given to the purchase of materials in the cheapest markets, and the getting of materials best adapted to the processes in hand. And, similarly, much thought has been devoted to the technical improvement in machinery and the introduction of inventions. Every up-to-date concern has its purchasing agents, its inspectors and laboratories, its machinists and inventors; but very few seem to have given particular attention to the most fundamental of the three elements—the men.

In spite of the prevalence of the talk about sanitation, safety, welfare, *esprit de corps*, etc., the most vital point of contact between managers and the men is the pay envelope. There is no solution of the problem of apparently conflicting interests between employers and employed that does not involve fundamentally the question of wages.

What is the relation of scientific management to the wage problem? Perhaps the easiest way to make clear the point at which I hope to arrive in this paper is to review briefly the history of wage systems.

It is rather difficult to say which kind of wages came first—day-rates or piece-rates. Probably both have existed ever since one man worked for another. Perhaps piece-rates came first; for we may imagine that, when our primeval ancestors got together and one of them decided to fish for a day if another would make axes that same day, they would swap products with each other. In other words, each was paying the other for a definite product, which is the essence of a piece-rate. In a condition of society in which foresight was not highly developed and complex thought was difficult, such a method was the easier and therefore probably the more common. But when the operations of labor became more

complex and the imagination more comprehensive, one would start to do something for another that would necessarily take more than a day. The workman in the meantime would have to live and could not wait until the product he was working on was finished before getting some kind of payment. His pay evidently could not be for a definite product and must therefore have been on a day-rate. But whatever the origin and the priority of these rates, it is a fact that they have existed side by side through all historic time.

The idea of payment for work involves the notion of equivalence of value, and this notion has crystallized into the common expression, "a fair day's work for a fair day's pay." These terms are exceedingly vague. A fair day's work seems to mean to most people that the workman shall keep busy for the greater part or the whole of the day, or at least appear to be busy. A fair day's wage in most minds means such a wage as will enable a man to live up to the standard of comfort common among his peers in the community. In primitive conditions if a man would work all day and his employer would pay him for that day's work what was necessary to enable him to live, the sense of fairness was satisfied.

Both of these ideas are exemplified in the parable of the man who went out early in the morning to hire laborers for his vineyard; an hour or two later he went out and hired others; late in the afternoon he hired still others; then at the end of the day each was paid a penny. The men that went to work in the early morning protested that, as they had worked longer, they should be paid more. The master of the vineyard, however, maintained that it was his right to pay what he chose, and his idea seems to have been that whether a man worked one hour or ten he needed the penny in order to live. The workmen were going on the theory that a fair day's work means working all day; the employer on the theory that a fair day's wage is what a man needs.

One obvious difficulty with day-wages lies in the fact that, though the wage may be fairly set by public opinion or by organization, the content of a day's work is not by that method established. You may satisfy the workman by giving him what he needs, what he has to have, but you have not necessarily satisfied

the employer that the workman has done a fair day's work merely because he has spent a certain number of hours on the job; for after all the employer's equivalent is not as a rule the mere command of the workman's time but a measurable product.

When the day's wage is set by public opinion or by organization, but the day's work is not, there is a tendency for the day's work to diminish gradually to the point where the workman can just keep his job. That this has happened in many cases is a matter of current knowledge, and is one reason for the dissatisfaction of employers with the day-wage; for the workmen have sometimes abused their opportunity and have done just the least possible; and their opportunity to do this has arisen largely from the fact that the employer has never really known what a fair day's work is.

When this condition becomes intolerable to the employer, the natural, the obvious thing to do is to pay for the unit of product instead of the time employed. The history of piece-rates is well known. On their introduction the employer pays for what he gets and the employee is paid for what he does. Both sides are satisfied and the production increases. The time soon comes when the workman puts forth all the energy he can muster to earn as large a wage for as large a number of units of product as he can possibly produce. The employer is highly pleased with the increased production, but soon begins to worry about the wages he is paying. Then comes the inevitable cut. The workman has himself established the rate of production of which he is capable, and the employer figures a piece-rate on this production which will just provide the man an average living wage. One or two cuts are usually enough to show the workman the futility of putting forth his best efforts under such a system; and the advantages of piece-rates have in many cases been destroyed in this way by the greed and the injustice of the employer. The opportunity for greed and injustice, however, arose from the fact that neither the employer nor the employee really knew what a fair day's work was.

It is generally recognized today that both day-rates and piece-rates are clumsy and inefficient, for the reason that the workman will frequently beat the day-rate and the employer will cut the piece-rate. This is made possible and practically inevitable by

the ignorance on both sides as to what is either a fair day's work or a fair day's wage.

Many efforts have been made to avoid both horns of the dilemma. From the fourteenth century on, legislation was depended upon. Legislation which set wages to meet the conditions existent at the time it was passed was fairly efficient; but the rapid changes in industrial conditions were not followed by equally rapid changes in legislation; with the result that the laws of the market prevailed eventually over the laws of the legislature. In fact near the beginning of our modern era of industrial organization existing legislation had actually become obsolete, and the attempt to regulate wages by act of Parliament was, under the influence of the ideas of Adam Smith, formally and officially given up.

Adam Smith's optimistic philosophy to the effect that if men were left alone the compromise effected by the conflict of their self-interests would work out to the greatest satisfaction of all, was not justified by the event. The Statutes of Labourers, though poorly fitting the conditions at the beginning of the nineteenth century, were some slight protection to the working-man; they established at least a minimum wage and, when they were repealed, the workingman was left at the mercy of his employer, and from his relatively weak position was forced down to and below the limit of endurance. His only resort was organization.

This was the time at which labor unions in the modern sense of the term established themselves, demonstrated the necessity of their existence, and got the foothold which they maintain in England and America and many other countries today. They were the answer of the under dog to the insolent assertion of prerogative on the part of the employers to establish any wages and any conditions which they chose to impose.

Labor unionism has not been exempt from the usual tendency of movements to go too far in the direction in which they started. The unions were organized originally to protect the employee against the aggression of employers; but as they began to feel their power and to exercise it, it was inevitable that in the course of a few decades they should turn the tables on the employers and themselves become the oppressors. They discovered that they

could tell the employers what the latter must pay but that the employers had no means of determining how much work the employees ought to do. The policy of restriction of output has been based on many arguments, but the most primitive and potent reason for it is the selfish tendency of human nature to give as little as possible for what it gets. When the employees through organization acquired the power to determine wages and the employers in their ignorance had no means of determining a fair day's work, a minimum output was the inevitable consequence.

If in some cases this tendency was counteracted by a sense of fairness and mutual dependence, in many more cases it was aggravated by the feeling of conflicting interest and inherent hostility between the two parties. In fact this feeling of hostility has been so prominent as to mislead many men into the idea that to solve the wage problem meant merely to establish cordial relations between the employer and the employee. Many means to this end have been proposed and tried.

One of the earliest attempts to bridge the gulf was to leave the method of payment unchanged but to secure the co-operation of the workingman by the psychological means of kindness, fair treatment, and the development of a spirit of loyalty and of personal satisfaction in doing the job right; this is the basis of the so-called "welfare movement." Experience has shown that where day-wages are paid and there is no established method of determining and enforcing a day's work, the best that can be done is to try to develop the spirit of co-operation by such methods.

There are many objections, however, to most welfare schemes. One reason for their frequent failure is the fact that they are largely personal to the man who instals and develops them. He is unable to resist the temptation to impose upon the workingmen his own ideas of what is best for them. Often also he is arbitrary and capricious. He looks at welfare work as a gratuity on his part which he can extend or withhold at his convenience. Sometimes also, in the excess of his zeal, he carries his welfare activities down to the most personal details of his employee's domestic management and arouses a feeling of strong resentment. But more important than these objections is the common and natural opinion of the

men that the firm which can afford to maintain welfare institutions can just as well afford to pay better wages, and that they (the men) have a right to decide for themselves how these wages shall be spent. And, finally, welfare schemes often bear the aspect of charity to the employee or of advertising for the firm; and in either case they come speedily to destruction.

Some manufacturers have said: "If welfare is charity and charity is disagreeable to the men, let us be businesslike. The success of our concern is the joint product of the men and the management, and it is businesslike for the management to share the profits with the men. We will limit our profits to 10 per cent and all over that we will divide among our employees."

The history of profit-sharing has been as discouraging as that of welfare movements. One or two conspicuous successes may be pointed out; but, on the whole, it is a history of failure. The reasons for this are numerous: in the first place the reward is too remote and uncertain; the workman may wait a year for his dividend and then find that there is nothing to be divided. He is usually suspicious that the accounts are being juggled in the interests of the management. In any case he finds his share of the profits ridiculously small in proportion to the increase of energy he may have put into his work. The most conspicuous example of this is the scheme of interesting the employee in the concern by allowing him to purchase shares; a holder of five shares in a company that has an issue of twenty million may double, treble, or quadruple his output and efficiency without producing the slightest effect upon the dividends on his shares. Beyond and behind all these reasons is the fact that people generally do not consider profit-sharing fair. Profit-sharing is a form of partnership, and a partnership should be for worse as well as for better; but the profit-sharing scheme divides part of the profits among the men and imposes all the losses on the management. Such a scheme is not and cannot be permanently satisfactory.

As these plans have failed one after another, other schemes have been proposed to take their place. It was felt that the interest of the workman, which the usual profit-sharing scheme had failed to arouse, might be secured if the workman were to get more

quickly the benefits of his increased activity. A straight piece-rate which would secure him such a benefit would carry with it the temptation to the management to cut; so the scheme was evolved of setting a standard time, based on experience, in which work could be done, and then dividing with the workman any time saved by the latter over the standard time. This amounts to notifying the workman in advance that, after certain earnings on a piece-rate basis have been reached, his rate will be cut one-half. Crude as it is, this premium system has been successful for limited periods in many cases. The management makes its cuts once for all in advance and the workman knows exactly what is coming. Unless some cut is made which is not scheduled, the men will work under this scheme with considerable interest and profit both to themselves and to their employer.

But this scheme also usually fails in the long run because it has not cured the fundamental weakness of both day- and piece-rates: to wit, uncertainty as to what is a fair day's pay and ignorance as to what is a fair day's work. In short, none of the current and historic methods of wage-payment satisfy the popular demand for equivalence incorporated in the expression, a "a fair day's work for a fair day's wage," for the reason that neither side of the equation has been until recently definitely determined. Where there is only uncertainty as to what constitutes either a day's work or a fair wage, there can obviously be no satisfactory solution of the problem.

So far as I know, the first recorded successful attempt in history to determine either side of the equation accurately and scientifically was made by Mr. Frederick W. Taylor at the works of the Midvale Steel Company thirty years ago. As foreman in the plant, Mr. Taylor found himself involved in the usual conflict over wages; and he observed that no matter what scheme he tried, he did not secure permanent satisfaction among the workmen or the employers. Nobody really knew what ought to be expected as a day's work. He set out, therefore, to devise a method to determine accurately if possible what a fair day's work was, and then to pay for the performance of this work in proportion as it exceeded the ordinary commonly accepted day's work on which the ordinary rates of pay were based.

As the result of several years' study and experimenting, Mr. Taylor evolved the method of time-study and the differential piece-rate which characterize his system of scientific management today. Where the differential piece-rate prevails, there are two rates for each product: one known as the low rate and the other as the high rate. For example, time-study shows that it is possible to produce 10 units of a certain product in a day; for each of these units the workman gets 35 cents, provided he produces the 10. But, if he produces less than 10, he gets 25 cents per unit. If he produces 8 units, he gets $2.00; if 9, $2.25; if 10, he gets, not 10×25 cents but 10×35 cents, or $3.50. This obviously provides a strong incentive to a man to accomplish the production on which the high rate is based.

The essential feature of the system is, however, that the standard production (known technically among the Taylor group as "the task") must be based on an accurate time-study; and it must be determined with the same impersonal and dispassionate desire for truth that actuates the scientist in his laboratory. The work to be studied is divided first into its elementary operations, and the time in which these operations can be performed after methods and materials have been standardized, is ascertained by a long-continued series of tests on an average man fitted for the job under observation. The requirements are intelligence, patience, analytical power, and the capacity for accurate observation on the part of the time-study man (for whom we should like to adopt the French name *chronométreur*), and honesty and skill on the part of the observed. Given these qualifications, the determination of a fair's day's work is a mere impersonal study of a physical fact. It is simply answering the question how long it takes to do a given thing, and the answer does not depend on any man's personality; it makes no difference whether the time-study is done by a union leader or by the owner of the works, by an old man or a young woman; personal interest plays no more part in it than it does in the measurements of an astronomer or physicist.

Time-study then, when made by competent men trained in its technique and the technique of the industry under observation, defines at least one side of the equation: namely, the content of a

fair day's work. Such study, when properly made, includes allowance for necessary rest and other necessary delays. When these facts are determined and a minimum time established, the conclusion is a positive, impersonal fact, the result of observation; it is not a matter of anyone's opinion or interest, but a fact established in accordance with the approved methods of scientific investigation.

Time-study, while but one element of the Taylor system of management, is typical of that system in its scientific method; and this characteristic method is that which has gained for the Taylor system the name of "scientific management," When such time-study is instituted in a plant, it involves the standardization of administration and of equipment, materials, and methods, and therefore implies a radical and revolutionary reorganization of the plant. The establishment of a fair day's work (the task) and the institution and maintenance of conditions which will enable the workman to accomplish this work and earn the increased compensation known as "the bonus," cannot be done successfully in a plant managed by the old methods. It requires more than a new mechanism; it requires a new mental attitude on the part of the management, the attitude of the scientific investigator, which is as free as possible from personal interest, and which assumes nothing that cannot be ascertained and proved; it means a new moral attitude—a substitution of the passion for truth for the reliance on guess work, ignorance, and bluff which has heretofore prevailed.

The usual method of setting piece-rates makes no claim to being scientific, even if in some cases it may be honest. Some plants establish their rates as the result of a series of observations of the time similar jobs have taken in the past; but as these observations show widely varying times for the same work, an average is taken which is simple arithmetic and nothing else. Others set a rate on the basis of what they can afford to pay in the prevailing state of the market. New rates are almost always set by someone's "judgment" which is merely a term for a more or less experienced guess.

For all these methods the Taylor system substitutes the method of the scientific observer. If the observer, being human and in some cases more in sympathy with the management than with the

men, allows his scientific judgment to be swayed by his desire to make the day's work as large as possible, he cannot do otherwise than overstep the mark to the extent of setting a task which cannot be accomplished. But this process is self-defeating, for if the task cannot be made, the bonus cannot be earned, and the men will not attempt to do the new day's work. The management thereby loses more than the men, and the intrusion of a greedy bias kills the goose that lays the golden egg.

The Taylor system therefore puts a firm foundation under one pier of the arch which is to bridge the gulf between employer and employee, in that at least it makes it possible to determine what is a fair day's work. What does it say about a fair day's wage?

Scientific management does not today attempt to establish what is a fair day's wage. It takes the prevailing rate of wages in the community and then proceeds to add to that a bonus in proportion to the achievement secured in excess of the ordinary achievement in that community. This process, however, leaves the basic rate to be determined as before; that is, by the ordinary daily bargaining in the market. We have seen that in this bargaining the disadvantage at which the workmen is placed by his dependence upon his work for a living has subjected him to abuse at the hands of his employers. Legislation has failed to determine a fair day's wage. It can set a rate of payment, but, until it sets the amount of work that is to be done for that rate and enforces the performance of the standard amount of work set, the rate is futile. In this fact lies the fundamental weakness of minimum-wage legislation. The law cannot compel an employer permanently to pay $8 a week, unless it can also assure him workmen who can and will produce at least $8 worth. Experience has shown that the good-will of the employer cannot be depended upon permanently to maintain a fair day's wage. Public opinion also has failed, for the reason that, while in an abstract way each man wants justice for the other fellow, he is not willing to make much personal sacrifice in the way of paying higher prices for the other fellow's product. Each member of the public wants to buy everything as cheap as he can get it, even if this cheapness involves someone's else low wages.

In my opinion it is as true today as it was a century ago that the

final resort of the workingman is in the collective force of organized labor. Under scientific management or any other system, the workmen must depend upon their combined power to enforce a minimum wage. But this policy will not succeed in the future any better than it has in the past, unless the demand for a minimum wage is accompanied by the promise and guaranty of a quantity of work which will warrant that wage. There is no possible harmony between scientific management, large output, and the social interest on the one hand, and mere unintelligent force, restriction of output, and class interest on the other. But the labor union which will adopt the policy of establishing a minimum wage as a basic rate on which a bonus, determined by the conditions of the industry, shall be paid for the performance of a proper day's work, and which, in addition, will assist if necessary in determining what a proper day's work is, and in enforcing the performance of that work on the part of its members, is acting at once in its own interest and in that of society. This would be a long step toward the solution of the wage problem and would help to bring about that co-operation of employee and employer which we all desire and hope for but rarely see.

It is something more than a dream that labor unions are sooner or later going to take over scientific management and make it their own. They have already established their right—by force, to be sure, as most rights are established— to determine a minimum wage. They have established their right to safe and sanitary conditions of work. There are cases on record where they have gone to the management and said: "You will have to scrap that obsolete machinery and put in new machinery." They have complained to state commissions of the obsolete equipment of railroads. They have even struck to compel the management to instal the Taylor system, and have done this, not because they were primarily interested in large output or higher profits for the management, or even in a lower cost to the consumer, but because they were intelligent enough to realize that in industry as elsewhere, knowledge is the foundation of justice, and only that method of management based upon knowledge can answer permanently the question of fairness.

Along this line a union can and should say to its employer:

"We do not care how much profit you can make out of your business but we insist upon having fair wages, and if you cannot make enough by your present methods to pay us fair wages, you must, if you want to employ us, organize your business on the most modern and scientific plan, so that you *can* pay us."

When labor unions arrive at that point of view, as they will when they get a type of leadership which is more interested in securing the welfare of their members through peaceful progress and co-operation than in earning their salary by fomenting strife—when they take over scientific management and say: "We believe in this and will help it because it means larger output, lower cost to the consumer, higher wages for ourselves, prosperity for the employer, general satisfaction and a higher standard of living; and because it is good for us we insist that you shall adopt it"—then we shall have a type of co-operation which is permanent because it involves fundamentally the welfare of both parties. And in this I believe I see as near a solution of the wage problem as we are likely to reach under our current form of industrial organization. This involves not the weakening but the strengthening of organization of both employers and employees, and the assumption of greater responsibility on both sides. It can come only with the increase of knowledge and under the predominating influence of a desire for truth and justice; and as usual the world is being driven toward truth and justice by the stress of the conflict brought on by ignorance and injustice.

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NOTES

THE SEMINAR IN THE COLLEGE

In the issue of this *Journal* for February, 1912, there appeared an article by Professor Seligman under the title, "The Seminar: Its Advantages and Limitations." One point which he developed in this article and which he took occasion to press home at every opportunity was that the seminar is a university method of instruction and as such should not be used in colleges.

The arguments which Professor Seligman presented in support of his contention do not seem to me conclusive. The subject, too, is of such importance to college teachers that a discussion of these arguments will not, I trust, be out of place.

Professor Seligman's thesis can be given in his own words: "The seminar is a strictly university method. When an attempt is made to introduce these methods into the college, the academy, and the high school, not only is it an abuse which will be utterly useless or worse than useless for the student, but one which will tend to cast discredit on the idea itself."

Although reference is made in the paragraph quoted above to the high school and academy, the arguments are mainly directed against the use of the seminar in colleges. For this reason and for the further reason that I am not acquainted with the problems of the high school and academy, I shall leave this part of his thesis untouched.

Argument No. 1.—" . . . . The seminar is an adjunct to specialization; but specialization, as we have already indicated, is the work of the university, not of a college or high school."

Granting for the moment that specialization is the work of the university, it does not follow that an *adjunct* to specialization is the exclusive property of a university. A library is also an adjunct to specialization, but a college has use for a library. Perhaps the seminar does offer to a man the opportunity to specialize, but I think that most teachers regard it as a method of instruction which enables them to develop in the student the power to do independent thinking. It is in the seminar, if anywhere, that the teacher can make a student realize what constitutes the basis for a sound judgment. And after all, is not this the college education most

"befitting a gentleman," Professor Seligman's criterion of a college course?

I do not think that a categorical answer can be given to the question of whether specialization is the work of a university or not, if by this it is meant that other institutions of learning are to leave the university undisturbed in the enjoyment of this prerogative. Individualization is, in punishment, the slogan of penal reform; and it is certainly as necessary in education. Whether a student should specialize depends not on his location in the hierarchy of educational institutions, but on a great variety of circumstances. This large way of lumping students in groups and classifying them according to some preconceived notion may be a university way of doing things, but it is contrary to the *raison d'être* of the college, particularly the small one.

Argument No. 2.—"The seminar connotes original research; college students have neither the maturity nor the training which are necessary prerequisites to independent thinking."

Has not Professor Seligman given here as reason for the nonemployment of the seminar in colleges a fact which is mainly the result of not using it? As well say, a swimming-pool connotes swimming: therefore do not construct swimming-pools among those who do not know how to swim. In other words, the lack of maturity and of training are not, as he seems to imply, a mere question of age, but one primarily of experience, of method, and of training itself. I believe that experienced educators will bear me out in saying that the kind of maturity and training which Professor Seligman demands as prerequisites to independent thinking can be developed very early in life by a system of instruction similar to that employed in the seminar, not only without detriment to the individual but to his immense advantage.

Argument No. 3.—"The seminar implies a certain equality between student and preceptor; the college boy is a manifestly absurd equal for his professor."

This might be a valid objection to the use of a certain type of seminar one, for example, from which the teacher himself expected to derive some advantage. But in case the seminar is strictly for the student's benefit, this question of equality is not likely to arise. The teacher will not be conscious of this feeling, once he has come to see and to understand things from the point of view of those whom he is trying to help. It is simply an attitude of mind, which a teacher must get rid of, any way, sooner or later, or fail in his mission.

Argument No. 4.—"The seminar imports the use of the co-operative method; but how can students, whose linguistic and literary equipment is necessarily of the slightest, successfully employ the arts of comparison and criticism?"

Two objections can be made to this statement. In the first place, it implies that one cannot successfully compare and criticize without linguistic and literary equipment. A command of languages does not enable one to think better or reason more accurately, but only to get at the facts. Now is it true that every subject which may with propriety be assigned in a seminar requires linguistic attainment on the part of the student? Could not any teacher think of several exceptions offhand? Secondly, do graduates as a rule possess this linguistic equipment, and, further, is it true that undergraduates do not? One cannot generalize here. All that can be said, it seems to me, is that some graduates are thus equipped and many are not. Moreover, my observation is that those who spend much time with the languages while undergraduates are not those who take up graduate work in economics. It is not a question of graduate students versus undergraduates, but of individuals versus other individuals.

As to literary equipment, it is also an individual matter, or at most a question of degree. Why not debar graduate students because they do not equal the standard of the professor? It is worth while to recognize that a literary equipment is not a *sine qua non* of seminar work. If it were, what would our university seminars do for membership?

Argument No. 5.—"The seminar involves the employment of the most advanced pedagogical methods; but advanced methods can be used only with advanced students."

In requiring some of her future candidates for the degree of A.B. to pass a comprehensive examination, Harvard has set up a test commonly reserved for the Doctor's degree. There is no a priori method of determining what constitutes an "advanced method" or whether this "advanced method" is fitted only for "advanced students." The test is a pragmatic one. The question is: Are there college students for whom such a method of instruction would be advantageous? This can be settled only by an investigation of the facts, which would, I believe, be favorable to my contention.

Argument No. 6.—"It would be useless because minds in a formative state cannot create. That which is itself being created cannot produce."

Is this to suggest that the minds of college students will cease to

develop on their graduation day? Will not growth possibly continue even after the Ph.D. stage of evolution has been reached? When, pray, is the mind finally created and ready to do business? And how, also, does it get created?

Argument No. 7.—"It would injure the student, because it would lead him to understand that he is doing original work, when he is only rehashing the work of others. It would foster habits of superficiality and vainglory."

In a properly conducted seminar, the work of the student is discussed and criticized; faults are pointed out and suggestions for improvement made. An ideal of good work is held up to him, and, whether he approaches it or not, superficiality is not the final result. Further, it could with good reason be argued that a strict standard of work can be more easily maintained in a college than in a university. The diffidence which a teacher might feel in criticising the results presented by a graduate of age and experience, would not be felt in handling undergraduates. Strictness is accepted as a matter of course in a college, and it is as easy to flunk a man in a seminar as in any other course.

Vainglory in intellectual achievement is not a common fault with American students. In fact, I am inclined to think that this habit ought to be encouraged. It is one quite easily checked and could be turned to good account.

Hash is hash whether served in college or in university; and is it not too commonly the diet of students? What else do they get from newspapers, magazines, books, and (one might add) from classes? The study of a state or local topic, which requires ingenuity in getting at facts from which inferences must be made and comparisons drawn, acts usually as a tonic on the system after such a diet.

Argument No. 8.—"The seminar, moreover, would react on the morale, not only of the student, but also of the teacher. No self-respecting teacher who comprehends what a seminar means could continue to employ these methods with immature students without becoming conscious that he is untrue to his mission. He pretends to be doing what he knows cannot be done. He is dissipating his energies without accomplishing any positive result, except that of more or less conscious deception."

This statement, if true, would make all opposition to Professor Seligman's views of no account for such opposition would naturally come from those who had thus employed the seminar, and they are *ipso facto* abnormal, of impaired morale, and self-deceived.

It has not seemed to me that Professor Seligman's logic was conclusive, or that he was thoroughly conversant with the problems of the colleges, at least not with those of the small ones. The colleges have changed much in the last few years; have to some extent become social forces; and are bringing their work into more direct relation with life. For them, the seminar will prove a successful method of instruction in that it will permit individual treatment and thus enable the teacher to develop whatever possibilities for constructive work a student may possess.

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WASHINGTON NOTES

THE STATE RATE CASES

Probably the most far-reaching decisions relative to the railroad situation that have been rendered during the past two years were handed down on June 9 and June 16 by the Supreme Court of the United States in the so-called "state rate cases." In a general way, the substance of the decisions is to the effect that while Congress has power to regulate rates within a state in so far as these railroad charges constitute an essential part of interstate commerce, Congress has not given absolute or complete power in regard to the matter to the Interstate Commerce Commission or to any other body, and consequently the commission cannot exert what it has not received. So long as the field of rate-making is unoccupied by Congress it may be occupied by the states, and the rates they make are to be upheld unless they involve confiscation of the property of the carrier.

The essential ideas in this decision were expressed by Justice Hughes, who read it in part in the following sentences, the whole decision itself including more than thirty-five thousand words:

> The Constitution gives Congress an authority at all times adequate to secure the freedom of interstate commercial intercourse from state control and to provide effective regulation of that intercourse as the national interest may demand.
>
> The commerce that is confined within one state and does not affect other states is reserved to the state. This reservation is only of that power which is consistent with the grant to Congress. The authority of Congress extends to every part of interstate commerce and to every instrumentality or agency by which it is carried on; and the full control by Congress over the subjects committed to its regulation is not to be denied or thwarted by the commingling of interstate and intrastate operations.

Even without action by Congress, the commerce clause of the Constitution necessarily excludes the states from direct control of subjects embraced within the clause which are of such a nature, that if regulated at all their regulation should be prescribed by a single authority. There is thus secured the essential immunity of interstate intercourse from the imposition by the states of direct burdens and restraints.

But there remains to the states the exercise of the power appropriate to their territorial jurisdiction in making suitable provision for local needs. The state may provide local improvements, create and regulate local facilities, and adopt protective measures of a reasonable character in the interest of the health, safety, morals, and welfare of its people, although interstate commerce may incidentally or indirectly be involved. Where matters falling within the state power, as above described, are also by reason of their relation to interstate commerce within the reach of the federal power, Congress must be the judge of the necessity of federal action, and until Congress acts the states may act. The paramount authority of Congress enables it to intervene at its discretion for the complete and effective government of that which has been committed to its care, and for this purpose and to this extent, in response to a conviction of national need to displace local laws by substituting laws of its own.

State regulation of railroad rates began with railroad transportation. The authority of the state to prescribe what shall be reasonable charges for intrastate transportation is statewide, unless it be limited by the exertion of the constitutional power of Congress with respect to interstate commerce and its instruments. As a power appropriate to the territorial jurisdiction of the state it is not confined to a part of the state, but extends throughout the states to its cities adjacent to its boundaries, as well as to those in the interior of the state. If this authority of the state be restricted, it must be by virtue of the actual exercise of federal control and not by reason merely of a dormant federal power, that is, one which has not been exerted.

The Court goes on to discuss the constitutional question thus developed considerably more at length and finally deals with the problems still left for Congress in the following manner:

The interblending of operations in the conduct of interstate and local business by interstate carriers, and the exigencies that are said to arise with respect to interstate rates by reason of their relation to intrastate rates are considerations for the practical judgment of Congress. If the situation has become such that adequate regulation of interstate rates cannot be maintained without imposing requirements with respect to such interstate rates of interstate carriers as substantially affect interstate rates, it is for Congress to determine within the limits of its constitutional authority over interstate commerce and its instruments, the measure of the regulation it should supply.

In dealing with the specific cases before it, the Supreme Court in its opinion of Monday, June 9, held that in the cases of the Northern Pacific

and Great Northern companies, which were the chief contestants of the Minnesota state rates, the examination of estimates of value and methods of apportionment showed that the proof is insufficient to justify a finding that the rates were confiscatory so that the decrees of the lower courts had to be reversed. On the other hand, the rates affecting the Minneapolis & St. Louis Railroad Co. were held to be confiscatory, the decree of the lower court in favor of the company therefore being sustained on the ground that the rates fixed by state authority were insufficient to yield the concern an adequate return upon its investment.

On Monday, June 16, the remainder of the state rate cases were dealt with by the Supreme Court, and opinions shaped along substantially the lines just indicated were handed down. In all, eighteen cases were disposed of. In eight of the suits it had been stipulated in the court below that the parties should abide by the decision reached in the other cases. Of the remaining ten, two were consolidated into one for purposes of trial, leaving nine suits submitted to the Supreme Court. Of these nine suits six resulted in action by the court sustaining the rates, these being the cases of the Chicago, Burlington & Quincy, the Atchison, Topeka & Santa Fe, the Kansas City Southern, the Missouri, Kansas & Texas, the Chicago, Rock Island & Pacific, and the St. Louis & San Francisco. The decrees in the case of the other three companies were reversed and the cases were remanded, the court holding the rates to be confiscatory as affecting the St. Louis & Hannibal, the Kansas City, Clinton & Springfield, and the Chicago Great Western.

Immediately upon the handing-down of these decisions many complaints were expressed both by transportation companies and by large shippers on the ground that the position taken by the court destroyed all uniformity of treatment of the rate question, and must necessarily result in additional legislation designed to occupy the debatable field said by the court thus far to have been left vacant by Congress.

THE ADMINISTRATION BANKING AND CURRENCY BILL

Work has practically been completed in the framing of the administration currency bill designed to furnish the basis for banking reform at this session of Congress. The measure was unofficially made public on June 19 and as thus issued turns out to be framed along the general lines that have been already outlined in these pages. Essentially the bill has been developed upon the plan prepared by Representative Carter Glass of Virginia and his advisers, who have been engaged in drafting the measure for more than a year past. The bill calls for the establish-

ment of not less than twelve local reserve banks, presided over by a single central reserve board called the Federal Reserve Board. Each of these banks is granted the powers of rediscount, purchase of bills, etc., that are ordinarily assigned to banks of rediscount, and each is required to hold a reserve of 33⅓ per cent gold against outstanding liabilities. The bill contains a peculiar provision with reference to note issues, in that it authorizes an issue of $500,000,000 of Treasury notes to be put out upon the request of the reserve banks, which are supposed to make application to the Federal Reserve Board for these issues. Additional notes are to be issued in proportion as national bank notes are retired from circulation. Whenever the application is thus made by a reserve bank for Treasury notes, the Reserve Board is bound to issue such notes, provided that the reserve bank is able to offer as collateral security very short-time prime commercial paper of classes specified in the measure itself with considerable detail. A reserve of 33⅓ per cent of gold must be carried to protect the notes as in the case of other deposit liabilities. These notes are redeemable at any federal reserve bank whether originally paid out by that bank or not. The peculiar and characteristic feature of the Glass bill is seen in the powers that it bestows upon the Federal Reserve Board. These powers are extensive and inclusive and are as follows:

a) To examine at its discretion the accounts and books of each federal reserve bank and to require such statements and reports as it deems necessary.

b) To require or on application to permit a federal reserve bank to rediscount the paper of any other federal reserve bank.

c) To establish each week, or as much oftener as required, a rate of discount which shall be mandatory upon each federal reserve bank and for each class of paper: *provided*, that said rate of discount need not be uniform for all federal reserve banks, but shall be made with a view to accommodating the commerce of the country and promoting a stable price level.

d) To suspend for a period not exceeding thirty days (and to renew such suspension for periods not to exceed fifteen days) any and every reserve requirement specified in this act.

e) To supervise and regulate the issue of Treasury notes by federal reserve banks.

f) To add to the number of cities classified as reserve and central reserve cities under existing law in which national banking associations are subject to the reserve requirements set forth in section 21 of this

act; or to reclassify existing reserve and central reserve cities and to designate the banks therein situated as country banks at its discretion.

g) To require the removal of officials of federal reserve banks for incompetency, dereliction of duty, fraud, or deceit.

h) To require the writing-off of doubtful or worthless assets upon the books and balance sheets of federal reserve banks.

i) To suspend the further operations of any federal reserve bank and appoint a receiver therefor.

j) To perform the duties, functions, or services specified or implied in detail throughout this act.

The bill provides for refunding the government bonds issued at 2 per cent as security for circulation behind national bank notes, at the rate of 5 per cent of their total volume each year, thus giving twenty years for the whole refunding scheme to be carried through. If any bonds remain unfunded at the close of that period they are to be compulsorily replaced by 3 per cent bonds, the refunding process for the first twenty years being voluntary on the part of the banks which are holders of the bonds.

On the whole the Glass bill is essentially a plan for centralized banking and centralized control of the banking process through governmental agencies vested with the power for overseeing and directing the operations involved in the banking system provided for under the bill. Criticism against it will probably come from those who believe that there should have been a single central bank with a large capital and with branches; and from those who dislike the changes in the reserve machinery of existing national banking which are provided for in this act. Others will complain of details. The refunding plan is not likely to be very acceptable to those bankers who want to be guaranteed the redemption of their 2 per cent bonds at par.

A good deal of interest undoubtedly centers around the bill from a comparative standpoint. Many persons are asserting that it is a modified copy of the Aldrich bill. While of course the principles of banking that must be availed of in any measure are permanent and unchangeable, there are fundamental differences between the Glass and Aldrich bills. The chief of these are as follows:

1. The Aldrich bill established a single central reserve association with fifteen branches; the Glass bill establishes twelve local reserve associations with a central government board overseeing them.

2. The Aldrich bill provided an elaborate mechanism for the government of the local branches which was such as to insure private control

and probably control by the larger banks. The Glass bill provides for complete government control of the central board which exercises the fundamental banking powers, while it gives the government a direct voice in the management of the local reserve associations through which the actual banking routine is carried on.

3. The Aldrich bill compelled the central reserve association to hold the present 2 per cent bonds, thereby tying up the funds of the concern and preventing it from doing any active business except in emergency. The Glass bill provides a straight refunding scheme which in the long run will cost no more and which provides for the shifting of the two's into three's without troubling the banking machinery of the country.

4. The Aldrich bill left the present system of redepositing bank reserves untouched. The Glass bill abolishes this system, admitted as it is to be obsolete and injurious, and makes the change gradually without inflicting any hardship upon the banks.

5. The Aldrich bill provided a note currency available for use in bank reserves, and thus susceptible of being used as a means of inflation. The Glass bill calls for an issue of Treasury notes which, however, are not put out except as business needs require them, such business needs being made manifest through the banks, and it refuses to make these notes either legal tender or available for use in reserves.

6. The Aldrich bill was positively opposed to the performance of any open market transactions by the reserve bank. This threw the sole control of rates of interest into the hands of the banks who were the sole customers of the reserve institution. The Glass bill permits certain restricted open market operations on the principles followed by the Bank of England, for the purpose of making the rediscount rate effective in the open market.

7. The Aldrich bill provided for elaborate and complex taxes which were likely to make the working of the reserve bank costly to the borrower. The Glass bill abolishes all taxes and simplifies the machinery, while it safeguards the government interests by taking all surplus earnings.

8. The Aldrich bill provided for special banks to do special business and to have branches abroad. The Glass bill allows this business to be done by branches of national banking associations.

9. The Aldrich bill granted a charter for a fixed period. The Glass bill places the reserve banks under the same control as national banks.

10. The Aldrich bill throughout failed to provide safeguards for use by the public authorities. The Glass bill subjects every step in the banking process to control whenever necessary.

BOOK REVIEWS AND NOTICES

The Government of American Cities. By WILLIAM BENNETT MUNRO. New York: Macmillan, 1912. 8vo, pp. ix+401. $2.25 net.

American City Government. A Survey of Newer Tendencies. By CHARLES A. BEARD. New York: The Century Co., 1912. 8vo, pp. ix+420. $2.00 net.

Those who regard the administrative problems of American city government as those most insistently demanding solution will inevitably be disappointed in Professor Munro's new work. They will find in it no discussion of the best methods of garbage disposal or the most enduring kind of pavement, or of the reorganization of police and fire departments for greatest efficiency, or of the proper provisions to be incorporated in public utility franchises. But the author has disarmed criticism on this point by admitting at the start that he will deal "with government rather than with administration, with the framework rather than with the functioning mechanism of the municipal organization"; and he justifies this limitation by the promise of a future volume on the latter phase of the subject. He has been forestalled in the matter, however, by the appearance coincidently with his own book of Professor Beard's *American City Government,* which is devoted almost exclusively to consideration of the administrative activities of municipalities. Indeed the two works admirably supplement each other; what one dismisses with brief comment the other handles extensively and in detail.

No treatise on city government could possibly be complete without some discussion of the relation of city to state and of the powers of municipalities. Professor Munro's manner of treating this problem is bold and commanding. Notice is served on the "home rule" enthusiast that in some matters, e.g., taxation, police, election regulations, indebtedness, education, and charities, especially in metropolitan districts composed of a number of separate municipal corporations, the city cannot be permitted a free hand; the state's interest in these matters is too large. Nevertheless, both Professor Munro and Professor Beard find it a considerable gain when cities are permitted to draft their own charters, as in Missouri, California, and several other states; for the

defects and drawbacks of special legislative charters on the one hand and of general city organization laws on the other are thus avoided. It is noted also that "home rule" has a value as an "agency of political education" and in helping to separate local from state politics. Other needs in this latter respect are wider power for the city, administrative rather than legislative supervision of those matters in which the state must take a hand, and the establishment of strictly municipal parties.

The recent demands for a wider participation by the electorate in the government of the municipality awakens little enthusiasm in Professor Munro. "They endeavor to supplant vicious leadership by no leadership at all." For example, "the substitution of the primary for the caucus has not changed the caliber or the methods of ward or city committees; it has merely given to the old order that added prestige which legal recognition of its status implies"; the recall "puts popularity before efficiency"; most of the arguments advanced in favor of the commission form of city government "can be urged with greater cogency for the policy of concentrating all final powers of an administrative character in the mayor alone"; the referendum is incompatible with the "short ballot" principle, in which, by the way, Professor Munro finds more possibilities for better city government than in many other latter-day political reforms. Nevertheless, Professor Munro, and Professor Beard as well present both sides of the argument on all these questions, thus leaving the student free to make up his own mind.

The organization of the municipal government and the distribution of its powers receive searching analysis and in some respects rather severe criticism from Professor Munro. The mayor's power of veto has in his opinion outlived whatever value it once may have had; the same is true of the system of aldermanic confirmation of the mayor's appointments and concurrence in his removals. Both of these powers are used by the bodies exercising them to shift or to evade responsibility; they belong in the "political scrap-heap," "among the discards of political science." The bicameral council as it still exists in St. Louis, Baltimore, Philadelphia, Pittsburgh, and Buffalo is stigmatized as an agency of malfeasance and blackmail, of profitless delay and needless friction. One of the causes of the growing impotence of American city councils is found in the paucity of its powers. Between the state government on the one hand and the city executive on the other the council finds itself shorn of usefulness. Professor Munro advocates an approach to the English policy of management of the city's business by council committees as a cure for both aldermanic and administrative incompetence. It is not

difficult to understand from the foregoing why he finds the commission form of government, with few exceptions, so excellent a development in American civic life. Both authors believe that municipal administration must be performed by experts, not necessarily as heads of departments but through the rank and file of departmental organization. Both, however, recognize the difficulties in the way of carrying out this principle —the apparent hopelessness of trying to separate politics and administration through an adequate and efficient merit system. School administration, in which a lay board directs the technical experts, is cited as an example of the best type of American municipal management.

The character of Professor Beard's book is best indicated by the titles of some of its chapters: "Raising and Spending the City's Money"; "Guarding the City against Crime and Vice"; "Franchises and Public Utilities"; "Municipal Ownership"; "Guarding the Health of the City"; "Tenement-House Reform"; "Municipal Recreation"; "City Planning," etc. Of these the first three named are unusually informative and provocative of thought. Rarely has the meaning of the city's budget been so graphically set forth. The various sources of revenue are discussed, together with the several methods of budget-making. Not least important is the description of the malpractices of careless municipal finance—transferring funds, loading pay-rolls, haphazard purchasing methods, etc. Segregated budgets with full publicity, uniform accounting, special "scrutinizing" officers, and ample chance for complaint by the citizen are needed to force the standards of city finance up to those set by efficient business concerns.

The question of dealing with vice and crime Professor Beard finds to be not merely a problem in police organization and administration but also one in criminal law and judicial machinery and practice. And it is not alone the underpaid, corrupt, inefficient police magistrate, often elected by criminal elements operating through the party, who is in need of reform. Organized crime defended by astute lawyers secures appeal after appeal, continuance after continuance, until eventually its cases are dismissed. The worst result of this is not the freedom of particular criminals, but the complete demoralization of the police and the police courts which thus find their efforts at crime detection and punishment of no avail. It is noted furthermore that the real cure for crime and vice is not found in criminal codes and police forces but in a change in economic conditions.

Professor Beard does not touch upon municipal reform except incidentally. Professor Munro, on the other hand, devotes a whole

chapter to this interesting subject. One important cause of the failure of reform movements in the past is found in their lack, usually, of appreciation of the fact that municipal ills are organic matters and cannot be cured by a mere change in the governmental personnel. Charter reform movements are therefore the most valuable. It is interesting to note, however, that the author himself believes that enlightened public opinion, sound traditions of city administration, and the putting of men of adequate moral fiber into office will accomplish more than change of organization.

These two books taken together furnish us with the most complete and up-to-date treatment of city government we have. Professor Munro's work is better suited to the student of government, its copious reading references and footnotes making it especially valuable in this respect, while Professor Beard's book, though important for the student, is more fitted both in matter and in style for the general reader. One must regret that Professor Munro has relied too confidently on Hatton's *Digest of City Charters*. Admirable as all concede this work to be, it is now seven years old, and seven years is a long time in this period of rapid development in all matters of government, especially of city government. Furthermore, we are still in need of one volume which combines in unified and connected treatment everything handled by these two. Nevertheless he would be indeed a captious critic and an ungrateful reader who would pick flaws in such much needed and such adequate and admirable studies in this most important and difficult field of American politics and administration.

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Railroads: Rates and Regulation. By W. Z. RIPLEY. New York: Longmans, Green & Co., 1912. 8vo. pp. xviii+659. $3.00 net.

Professor Ripley's book satisfies a real need and takes a unique, as well as an important, place in American economic literature. It is the first comprehensive and thoroughgoing analysis of the rate-making forces as actually operative in the United States, and as such its publication is a red-letter event in the history of transportation literature. The book is written from the standpoint of social welfare, and its author accepts without question the desirability of strong federal regulation of railway rates and service. Moreover, it gives a strong impression in favor of

administrative as opposed to judicial control. So generally, however, are these points now accepted by economists that few if any will look upon them as evidencing any taint of bias.

The 646 pages of text are distributed about equally among three general topics: approximately one-third concerns classification and rates; another third deals with traffic problems and discrimination; another centers around the Interstate Commerce Law and its interpretation. The author states that the reform of classification practice is the greatest need in the transportation field today, and that this reform must come through the federal government. He evidently considers the report of the Railway Securities Commission to have been a little overconservative, and criticizes adversely their statements that little relation exists between capitalization and rates, that it would be well to do away with par values, and that railways need encouragement through less rigid anti-stockwatering laws. In dealing with the waterways problem he very properly maintains that when the first cost of waterways is considered, transportation will generally be found cheaper by rail than by water. Of the work of the Commerce Court (as well as of the courts in general), the author is fairly critical, though we may infer it to be his judgment that with powers as now restricted such a court may do good work by facilitating judicial interpretation. The merits and services of the Interstate Commerce Commission are brought out forcefully and set in a bright light.

Important and admirable in many respects as it is, Professor Ripley's book falls considerably short of being a perfect piece of work. The very strength and magnitude of the work as a whole make its shortcomings the more regrettable. One can but exclaim, "What an opportunity for a masterpiece!" There is a lack of emphasis and order which will detract from the effectiveness of the book. The author states that "it may be alleged that in places so thick are the circumstantial trees of evidence that one can scarcely perceive the wood of principle." Concerning considerable parts of the work this needs no "alleging," for it is an obvious fact; and if, as the author states, it is an almost indispensable result of his inductive mode of work that there should be such a plentitude of reference and example, one must regret that this method was so extensively used. Moreover, the arrangement is not always good. In spite of the author's predilection for induction, the theory of rates is introduced immediately after a short introductory chapter on history; the chapter on classification follows and is widely separated from the chap-

ters on rates; the bulk of chap. xii ("Movement of Rates since 1870") might as well have been made chap. ii or chap. xx; several of the chapters have little internal unity (e.g., v, xii, xviii, xx).

It is perhaps a shortcoming of the work that practically nothing is written concerning the passenger, mail, and express branches of railway business; the title should have been "Railroads: *Freight* Rates and Regulation."

Another important defect is the large number of inaccuracies of fact which occur in Professor Ripley's pages. In the first chapter one gets a decided shock, or series of shocks. For example: The Baltimore and Ohio was chartered in 1827 (not 1821); Peter Cooper's "Tom Thumb" did not make its trial run out of Philadelphia; the Erie was carried to the Lakes at Dunkirk, *N.Y.;* the South Carolina Railroad was not operated between 1828 and 1833 (construction began in 1829); the free railway iron law was not repealed in 1843, but in 1841 (to go into effect in 1843); from 1832 to 1843 inclusive is not 11 years, and during those years nearly $6,000,000 were refunded (not "nearly $5,000,000"); brisk recovery set in after 1864 (not 1865); 7,379 miles of line were built in 1871 (not 1872); 11,569 miles were built in 1882 (not 1883); the act of 1864 gave the Union Pacific 20 alternate sections (not 10). Also the report of the Commissioner of Corporations on the Petroleum Industry was made in 1907, (not 1906); the Elkins act did not practically eliminate personal discrimination (p. 215); etc. And is it true (p. 488) that since 1900 there has been a more accentuated and irresistible rise in the charges for transportation than in the prices of commodities?

Another class of errors which occur in considerable numbers is illustrated by the following cases: On p. 7, the reader is given to understand that the rise in prices between 1826 and 1835 was due to the opening of canals, nothing being said about inflation. On p. 176 we are told that "to a manufacturer an increase of freight rates, instead of curtailing output, may lead to attempts to lessen the costs of production per unit by an enlarged output sold at *cut prices*." Now this is a considerable, though not *impossible* feat—to reduce prices while at the same time paying a higher freight rate—but one is filled with wonder to learn in the next sentence that the cutting of the price occurs "without any gain to the consumer." Again, Professor Ripley states that nothing is more certain than that "no direct causal relation between freight rates and the intrinsic [?] value of commodities is traceable" (p. 180). This statement may be true, but in the absence of further explanation it is hard to reconcile it with statements found on pp. 183 and 317 to the effect that

the value of commodities does make a controlling factor in rates in certain cases.

The relation between classification and rates does not seem to be clearly and convincingly handled. Thus it is stated that freight "tariffs" (rates) and "classifications" are as distinct and independent in source as they are in nature (p. 303). The author's own discussion, however, shows the impossibility of reasoning on this basis (e.g., p. 319); and his argument that rates and classifications differ in that, while rates are made by individual lines, classifications are made by *groups* of lines, is plainly superficial in view of the fact that single lines used to have individual classification, and now file whatever exceptions to the group classifications they please (p. 304).

Nor is the author's discussion of increasing returns impervious. On p. 86 he states that "the most important single factor in the production of increasing returns upon a railroad is the density of traffic; that is to say, the amount of business which can be conducted with a given set of rails, terminals, and rolling stock." Now, although "density" is hardly a *single* factor—and certainly is not the traffic which *can* be handled—this statement might pass unchallenged; but when one reads on p. 99 that this same law of increasing returns "originates primarily in the fiscal conditions" and that from this fact rather than from economies in large-scale production the law is to be affirmed of railways, one is confused.

Though Professor Ripley sometimes slips into the circle which is completed when one forgets that "value of service" is what the rate is supposed to express (thus confusing objective "value" with "utility to shipper"), his treatment of the two rival theories of rates, cost and utility theories, is admirable. The reviewer would merely observe that the reader has to turn to the second chapter on rate-making *in practice* to find this treatment of theory; and that, in view of the progress that has been made by railways statisticians and state commissions, Professor Ripley is perhaps a trifle dogmatic in concluding that "no logical distinction of expense even as between passenger and freight traffic is possible" (p. 70).

The foregoing are not the only imperfections. The reviewer's point is that they are representative. In short, one soon reaches the conclusion that the author has not taken sufficient care to keep his logic consistent and free from looseness. Undoubtedly Professor Ripley has been chiefly concerned with far-reaching traffic problems and broad questions of public policy; but, nevertheless, it is unfortunate that breadth and

reach have been obtained at the expense—in the details—of so much inaccuracy, congestion of data, and blurred logic.

The unmixed merits possessed by the book are its concreteness and its wealth of illustrative data "painstakingly gathered through many years from original sources." The emphasis which is laid upon traffic conditions which lie back of rates, together with the analysis of those conditions, constitutes an important contribution. There is some brilliant analysis of the regulation situation in the United States; and some of the descriptions of the numerous interstate commerce cases which are cited are as interesting as any story. Finally, the social point of view is maintained throughout, a fact which makes for consistency in essentials, breadth, and permanence of value.

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Report of the Board of Arbitration in the Matter of the Controversy between the Eastern Railroads and the Brotherhood of Locomotive Engineers. Report Submitted November 2, 1912. Washington: Published under the Direction of the Secretary of the Board. Large 8vo, pp. iv+123.

Under our present capitalistic system struggle between the factors in production for their share of the product is a common phenomenon. The results of these struggles have ordinarily been determined not by rules of justice but by a test of strength. Capital, through legal arrangements which have made possible our large combinations, interlocking directorates, etc., has until recently wielded the strong hand. Only within the past few years has labor, through its unions and concerted action, emerged from its passive state of submission. Another party to the struggle often overlooked is the consuming public. Especially important are the interests of this third party in the operations of public service corporations. The measure in which the public is affected is determined by the intensity of the struggle; and the intensity of the struggle, in turn, rests upon the relative strength of the opponents.

The great strength of these contestants, the magnitude of the problem, the gravity of the situation and the predicament of the consuming public, and the inadequacy of the Erdman act will be quite obvious to the reader who turns the pages of this report of the Board of Arbitration. The report covers in all 123 pages, including statistical tables and charts showing the rates of pay of railway employees in

various sections of the United States, taken, for the most part, from the statistical reports of the Interstate Commerce Commission.

After relating briefly the history of the case before it, the members of the board turn aside to discuss the relative positions of the railroads and of the engineers. In considering the return which should go to capital, they are in perfect accord with the previous holdings of the Interstate Commerce Commission, that the railroads are entitled to a fair return on the capital invested, but feel that such fair return is not capable of accurate determination in the absence of a competent physical valuation of the railroads of the country. They say (p. 40): "But only when we have the physical valuations of the various roads concerned, and can compare them with the funded debt and the bonds and stocks, shall we know the relative amounts which are claimed for 'values as going concerns.'"

In the absence of any "generally accepted theory of the division of income between labor and capital, ... the Board feel compelled to base their award upon existing facts, rather than upon a theory regarding the division of the fruits of industry," and therefore resort to a comparison of the rates and earnings of engineers in the eastern district (1) with those of engineers in the western and southern districts; and (2) with those of other classes of railway employees. As a result of this investigation, the board conclude that the engineers are entitled to a fair wage, and that the establishment of a minimum wage for each class of service is the best means of accomplishing this end.

The general considerations in the latter part of the report are of especial concern to those interested in the promotion of harmony between capital and labor. The board criticize the Erdman act, and recommend a permanent wage commission analagous to the Interstate Commerce Commission.

The majority report is signed by six of the seven members of the board, with an explanatory note by Mr. Willard, representing the railroads. Mr. Morrissey, the representative of the engineers, submits a minority report in which he criticizes (not without justification in some instances) certain findings of the board. Especially does he attack the use of statistics by the board; and the proposition of a permanent wage commission, on the ground that it would "strike at a vital and fundamental principle affecting the legal and economic rights of railway employees."

The board, by reason of the limitations placed upon them, are quite conscious of their inability to make the thorough investigation which the

situation demands, and to arrive at a solution which will be fundamentally correct and just to all parties concerned. The most that can be hoped for is a satisfactory compromise, not substantial justice. The report is chiefly valuable, not for the decision reached, nor for the data submitted and considered, nor for the reasons invoked in support of the findings, nor for the possible permanency of the award, but for the point of view which it suggests to the reader—the serious possibilities of the present system, the inadequacy of legislation now in force, and the need of a better correlation of the interests of labor, capital and other members of society in the operation of industry.

B. WALTER KING

UNIVERSITY OF CHICAGO

Power of the Federal Judiciary over Legislation. By J. HAMPDEN DOUGHERTY. New York & London: Putnam, 1912. 8vo, pp. viii+125. $1.50 net.

This little book is one of a number lately published treating the questions involved in the judicial power of declaring laws unconstitutional. It is rather a popular propaganda monograph against the doctrines of the recall of judges and judicial decisions than a scholarly treatise on its given subject.

The author apparently assumes that the only reason for the agitation for the recall of judges or decisions is the excessive use or abuse of the power to declare laws unconstitutional. Hence he seeks to show that this judicial power to declare laws unconstitutional was known in other countries before it was adopted in the United States, that it was intentionally and *expressly* given to the courts in the Constitution by the founders, and that it has worked well on the whole. Finally the author gives a few modifications which, he thinks, will eliminate whatever faults have crept into our practice of declaring laws unconstitutional.

On the question of whether the practice of allowing the courts to declare legislative acts unconstitutional exists or existed in other countries or systems of jurisprudence, the author makes no pretense at authoritative study of the sources; but gives general quotations from other writers which, he contends, show this practice was known in other countries. No distinction is drawn by the author between the power of a court to declare unconstitutional the legislative acts of a subsidiary state and the power of holding void the acts of a co-ordinate legislative body. Of the former power there are instances in other countries; of the latter, it is practically agreed among students of the subject, there are

none. Our federal courts exercise both powers and it is especially the latter which has been designated as "usurped" and the exercise of which by state and federal courts has met with criticism.

That the power to declare laws unconstitutional was given *expressly* the author seeks to prove from the clause of the Constitution making the Constitution and laws made in pursuance of it the supreme law of the land, together with the judiciary clause, which gives the federal courts jurisdiction of all cases "arising under this Constitution," etc. It is a perversion of the meaning of the word, especially in its legal sense, to say that this is an *express* grant of the power. It may be an implied grant of the power to the federal courts to declare state laws unconstitutional, but it does not even furnish an implication of the power to deal in this way with laws of Congress. That the founders intended the courts to have this power has been quite conclusively established from the debates in the convention, and the author shows it by the same means.

The proof that the power to declare laws unconstitutional has been well used by the federal courts consists largely in declamatory praise of these courts. The remedies suggested for any ills that may have sprung up in the system of declaring laws unconstitutional are the oft-advanced expedients (1) of requiring unanimous decisions to declare laws unconstitutional, (2) of permitting a rehearing to the state through its attorney-general, who would express the will of the people, in every case in which a statute is declared unconstitutional; and the further proposal of a change in the federal statute governing appeals from state courts so that an appeal might be had to the United States Supreme Court in every case in which a state law was claimed to violate the federal Constitution. At present appeals are given only when the state court has decided in favor of the state law.

As a scientific work the book loses on account of its extremely argumentative style; as a popular argument against the recall of judges it covers only a small part of the ground.

A. W. RICHTER

MARQUETTE UNIVERSITY

Valuation of Public Service Corporations: Legal and Economic Phases of Valuation for Rate Making and Public Purchase. By ROBERT H. WHITTEN. New York: Banks Law Publishing Co., 1912. 8vo, pp. xl+798. $5.50.

This book contains the best discussion of topics within its field known to the writer of this review. Moreover, it is a model of the method of

treatment that should be followed in dealing with any part of that large and important field where law and economics overlap. All important American material upon each topic is carefully collected and analyzed, the principal arguments being represented by adequate extracts from original sources, and the author's summaries are convincing and notably free from dogmatism or impatience. Not only are court decisions made use of, but also the wealth of matter not readily accessible in the proceedings of public service commissions, the reports of special investigators and committees (usually of municipalities), and articles by experts in engineering and accounting journals. Some of the more important topics fully considered are: purposes and standards of valuation, valuation of land and of donated property, overhead charges, depreciation, going concern and franchise values, and rate of return. There is a full classified bibliography and index. The book should be indispensable to all who would deal intelligently with the problems it discusses.

JAMES PARKER HALL

UNIVERSITY OF CHICAGO LAW SCHOOL

Socialism from the Christian Standpoint. By FATHER BERNARD VAUGHAN, S.J. New York: Macmillan, 1912. 8vo, pp. 389. $1.50 net.

The distinguished ecclesiastic discusses in these lectures the relations of socialism to the Papacy, the state, the individual, the family, religion, Christian socialism, ownership of property, and social reformation. The account of socialism as a politico-economic doctrine and program is a minor part of the discussion; the outline of conservative methods of improvement is a brief sketch which simply indicates the main lines of social legislation and semi-philanthropic "welfare work" of employers. The main interest of the book lies in the fact that it reveals in vivid colors and strong lights the irreconcilable conflict between socialism as a party and the ancient church. The modern revolt against ecclesiastical dogmatism and determination to dominate secular life by authority has reached in socialism its most acute expression, and compromise is impossible. The argument of this book makes its principal appeal to all those, Catholic and Protestant alike, who identify Christianity with ecclesiastical authority. Men of this type—and many of them are distinguished for high character and noble aims—are committed to a view of life which is absolutely opposed to that of the leading socialists; but a view which is also at war with all men who think in the terms of evolution and

modern science. It may be true that conspicuous socialists have attacked the ancient ecclesiastical claims with less delicacy and more rudeness than others, but they are supported by modernism in all camps.

Therefore it becomes necessary to distinguish between the politico-economic doctrine of socialism and the anti-theological tendencies which most socialists share with the children of the Renaissance of all schools. The eloquent author has brief glimpses of this fact, as when he says (p. 178): "John Spargo may be right in telling us that socialism will fit in with the new Christianity, with the Christianity of the evolutionist and the modernist." That which Father Vaughan refuses to admit is progress in theology and acceptance of any of the fundamental working hypotheses of modern science; but this has no meaning to a religious man who is also a modernist. The economic teaching can be and should be considered on its merits, and the metaphysical notions of some of its advocates should be dealt with apart and by another class of specialists. It is confusion to try to lump all together.

C. R. HENDERSON

UNIVERSITY OF CHICAGO

The Worker and His Country. By FABIAN WARE. London: Edward Arnold; New York: Longmans, Green & Co., 1912. 8vo, pp. xi+288. $1.40 net.

The author first pictures as it appears to him, the failure of representative government to accomplish what has been hoped for from it by the proletariat. The hardship and suffering of the workmen in England, the very home of parliamentary government, is graphically depicted. The situation, it is held, is portentous. "Mankind is passing through a stage in its history for which the past offers no parallel and little guidance" (p. 10). "Man is learning, in the confusion of the rival systems [science and philosophy], to mistrust the guidance of the intellect and that weathercock reason, and to rely more and more on his instinct" (p. 11). "There has been a reversion or a revolution to the spiritual equality of Christian teaching, often, it is true, in disassociation from its altruism and its dependence on divine sanction" (p. 12). "To many it will indeed seem that [England] is gathering herself together for a leap into the unknown future to which revolutionary ideals beckon the oppressed" (p. 14).

The next step beyond the nation in the evolution of the association of mankind would be internationalism. "Representative government which has resulted from the abortive attempt to achieve democracy only represents a stage, an experiment, a groping to find the human order toward which mankind has been given an overpowering impetus in the last century and a quarter"

(p. 57). Upon the question what the next order will be like, the author does not attempt to throw much light. The labor movement, especially in France and Germany since the French Revolution, is traced in considerable detail. Its aim at internationalism is constantly emphasized. The first successful national strikes are rightly pointed to as indicative of a new epoch in the history of labor. The French *bourses du travail*, or labor exchanges, are given much attention and their progress toward syndicalism, described as "a state within the state," is forcefully brought out. "The sovereignty of the existing state, in which the working classes have been refused the recognition of their democratic rights until it is too late to grant them, is little more than a name. It is already replaced in the minds of the working men by an ideal expressed by Pelloutier in the vague and baffling language which from time to time breaks the silence of instinct: 'The only justifiable sovereignty: That of labor'" (p. 225).

Turning again to England, the author tells us that "the Mother of Parliaments itself is rapidly losing credit with the people, and the laws which it makes and unmakes are exciting less and less interest among those whom they are intended to benefit" (p. 228). "Confusion touches the absurd when a trade union pleads in open court in defense of its action, its privilege as an illegal association, and all the subtlety of the law is required to prove it legal. (See *The Times*, 3rd July, 1912.) . . . . Every weakening of the existing order encourages and strengthens the attempt of the working classes to create a new order, to revert to the human order" (p. 230). That the working classes are ready for internationalism to the extent that they will not fight for their own country in a crisis, is, however, strongly denied by the author. The struggle of women for equal rights is heartily approved. What the human order really is or what the author really expects will happen, or hopes will happen is, as already intimated, by no means made clear. He does not want state socialism; in fact, this is one thing above others that he wishes to avoid. We read, for instance: "What is at stake in the contest in which society is now engaged, is far more than the domination of any one class; it is liberty itself, which will be swallowed up in the tyranny of state-collectivism unless every assistance is given to the working classes to achieve their emancipation through the human order" (p. 268).

The author in his preface admits the lack of system or logical sequence in his book and excuses it on the ground that it deals with the "activities of human instinct" and "here [we are told] is no plain sailing—one embarks on a storm-swept unfathomed and uncharted sea." The book is evidently intended as a warning to Englishmen "who place the interests of a nation before that of any class," to act promptly in seeking a solution of the dangers that threaten. Among these dangers, it is intimated, is the possibility of "a European war." The book is striking, not to say startling, in its force and originality, and presents, it is believed, a view of the labor movement which merits the serious consideration not only of England but of all civilized nations.

The Stock Exchange from Within. By WILLIAM C. VAN ANTWERP. New York: Doubleday, Page & Co., 1913. 8vo, pp. 459. $1.50 net.

An experience of thirty years as a member of the New York Stock Exchange, a wide reading in the literature of economics, and a vigorous literary style have enabled Mr. Van Antwerp to produce a work worthy of the institution in whose defense it is written. The misdeeds of a few have brought the Stock Exchange into popular disfavor, and such incidents as the Cordage scandal and the Hocking Coal episode have blinded the public to the real services of the speculator in stocks. The evils of the curb market and the practices of the bucket-shop operators have confused the public mind with regard to the Stock Exchange. In actual fact, the authorities of the New York Stock Exchange have been responsible for the almost complete eradication of the bucket shop; and the fact that the curb market exists is proof of the sound character of the Stock Exchange. Mr. Van Antwerp devotes a large part of his book to clearing up these popular misapprehensions regarding the institution of which he is a member.

After demonstrating upon what insufficient grounds the popular prejudice against the stockbroker rests, the author sets forth the benefits that flow from the Stock Exchange. The practice of "short-selling," he argues, makes for a stable market in stock securities; in periods of depression the "bear" by his covering transactions injects into the market a necessary stimulant. The careful scrutiny by trained financiers of every branch of business activity results in a nice adjustment of enterprise and capital. Directed by the stock market, capital flows to the most productive industries, and over-investment in any branch of business enterprise is corrected. The funds accumulated by the banks are employed profitably and with the minimum of risk by the broker. Mr. Van Antwerp contends that the Stock Exchange is useful as a means of avoiding crises, and where the crisis develops in spite of the stock broker, the same agency minimizes the evils of over-expansion of credit.

The author has interesting chapters on the technique of the stock market, on the London market, and on the Paris bourse. He compares, unfavorably with the New York practice, the division of the London operators into jobbers and brokers; the merging of the two functions results in a wider market. He considers that the system of daily settlement in New York tends to restrain reckless dealings, while, on the other hand, London's system of fortnightly settlements allows the banks to prepare for an emergency.

What in Mr. Van Antwerp's book impresses one most is the evidence of the honor and integrity that prevail among the members of the Stock Exchange. One realizes, in reading this book, how keenly sensitive the stockbrokers are to the sweeping and reckless charges made against them by politicians and magazine writers. The impression of the public and even of eminent authorities on economics has been that the average broker is dishonest and indifferent to criticism. *The Stock Exchange from Within* will help to change this too common attitude.

Special Libraries. Efficiency Number. (Vol. 4, No. 5, May 1913). Indianapolis: The Special Libraries Association. 25 cents.

The May issue of *Special Libraries* devotes itself to the new efficiency movement in modern commerce and industry. It falls into two main divisions: (1) a discussion of the need of the modern business man or manufacturer for information both for himself and for his employees about his own business, and (2) a series of bibliographies of books, periodicals, and articles to supply the needed information.

In the first part Mr. St. Elmo Lewis, member of the Efficiency Society and author of *The New Gospel of Efficiency*, reviews the great progress already made in bringing the scientific attitude of mind to bear upon commercial and industrial problems. He finds that the meat of the matter is the turning of attention to value rather than to price. He says: "The 'system' man's mind was occupied with the past. He came soon to know what things cost him, but as to whether it was too much or too little, he knew nothing. . . . . He knew the price of his labor and of his materials, he did not know their value." He believes the efficiency idea is the product of the younger college-trained man, who, before he came to have any rule of thumb, had learned to question all empirical rules and who was on his guard against prejudice in favor of his own personal experience. Mr. Lewis suggests, as an aid to the business man who wishes to run his business efficiently, that he begin the collection of a reference library of select books, periodicals, and articles bearing directly on his type of business. He gives the plan of the special library now being collected by the firm of which he is advertising manager.

The second part of the issue is taken up with select lists of references on scientific management and efficiency. The lists are divided into the following groups: (1) General. In this group are listed those books and articles which have a general application to commercial and industrial problems. (2) Special Aspects. In this group are to be found references on special problems such as accounting, labor efficiency, motion study, and wages adjustment. (3) Special, including books, periodicals, and articles specially intended for particular industries and types of industry. It is astonishing to note the quantity of the literature of the subject when one also notes how recently the subject has been a subject at all. Practically all the books listed, save only a few on advertising have been brought out within the last three years, and fully two-thirds of them within a year. Among the articles in periodicals, four are listed for 1906, seven for 1907, thirty-seven for 1912, and thirteen for the first two months of 1913! Both the student of commerce and industry, and the business man who wishes to keep abreast with his times should find these book lists helpful.

The Evolution of States. By J. M. ROBERTSON. New York: Putnam, 1913. 8vo, pp. 487. $2.50.

The viewpoint of this book may be understood from the author's own words, contained in his introductory chapter (pp. 2–3): "What is most wanted in history is sociological truth rooted in psychology and biology. The evil of theoretical extremes is not so much their falsehood as their irrelevance. If we are to instruct each other in conduct, it must be in terms of sympathies and antipathies; and if we are to profit by a study of politicians who are among the most generally typical of men, and of politics which is the expression of so much life, we must go about it as humanists and not as fatalists." In a word he asks students and writers of history to use their powers of observation and application more and their imagination less. The growing recognition of this position he points out in the Preface (p. viii): "Alike as to ancient and modern history the effort of scholars is now more and more toward comprehension of historic causation in terms of determining conditions, the economic above all."

In applying his principles, the critic successively considers the growth and decay of the Roman and Greek politics, the case of the Italian republic, the lesser European states, among which he includes the Scandinavian peoples, the Hansa, Holland, Switzerland, and Portugal, concluding his study with an analysis of English history down to the constitutional period.

He taboos as meaningless the personification of states so often resorted to. Imperialism as a nationai policy, glorified by some, to him has only destruction as a consequence. The tendency to attribute certain higher racial characteristics to the Germanic stocks, especially the Anglo-Saxon, as compared with other peoples, he deprecates as a mania. Throughout, the predominating influence of economic interests is emphasized.

It might be inferred from this brief survey that the book is mainly destructive. On the contrary, it presents a constructive thesis of historic causation which is amply substantiated with quotations and exact reference.

The Family and Social Work. By EDWARD T. DEVINE. New York: Association Press, 1912. 12mo, pp. 163. 60 cents.

This little book is a strong plea for effective social work organized and directed with a view to the improvement and elevation of the institution of the family. "All kinds of social work," we are told, "may be described in terms of family welfare. All kinds of anti-social influences may be measured by their untoward effects on family welfare" (p. 31). The duty of the social worker is to rehabilitate and redeem, not to eliminate. Though by no means denying the principles of eugenics, the author takes a decided stand against the radical adherents of this philosophy on the ground that "what is wrong

with most of those who are making shipwreck of their lives is not their remote ancestry, not their protoplasmic inheritance, not their inborn nature; but their home life, their education, their associations, the conditions under which they earn their living, the institutions under which they live . . . ." (p. 50).

Greater social control in industry is urged. But in such social institutions as the school, it is held, there is danger of going too far and thus undermining parental responsibility. Yet, where the parents cannot be induced to give proper care, society must step in and do so. "The first claim of the child is upon its own parents, but society underwrites the obligation, and if parenthood is bankrupt the community must see that the claim is met" (p. 83). Vocational training in the schools is advocated as a means of doing away with the industrial inefficiency which so often leads to divorce and desertion. In the case of the abnormal and degenerate, colonization and complete control is pointed out as the best solution, but in the case of others who may need assistance of some kind, "the one thing which we should not do is to relieve them of the responsibility of shaping their own lives" (p. 131). That the little volume is well written and well worth reading by anyone at all interested in social problems, it is, in view of the wide reputation of the author, hardly necessary to state.

La coopération neutre et la coopération socialiste. By E. VANDERVELDE. Paris: Felix Alcan, 1913. 12mo, pp. 226. Fr. 3.50.

Co-operative consumers' associations have developed more or less in all leading countries in such a way as to constitute a very important factor in the socialistic movement of our time. In the beginning rejected by nearly all socialistic schools, consumers' co-operation has latterly been more and more recognized as an efficient means to foster the advent of the socialistic organization of economic life. Two different types can be distinguished among the numerous associations of the different countries, namely those which are neutral and those which are socialistic. The neutral associations, which have as organs the Union Coopérative in France, the Konsumgenossenschaftliche Rundschau in Germany, the Co-operatives News in England, consider co-operation as *the* means of solving the social question by organizing all consumers and by absorbing gradually all branches of production and distribution. They appeal for the realization of this ideal to all consumers without distinction of creed, opinion, or class. They claim that co-operation is self-sufficient and that it must preserve absolute independence with regard to political parties. For the socialistic co-operators, on the contrary, according to their resolution at the Copenhagen Congress, co-operation is only *one* means for the emancipation of the working class. They consider the co-operative movement a class movement which concerns only working-men. They claim that between co-operative associations, labor organizations, and political parties intimate relations must be established in order to focus their efforts upon the common

goal: political and economic expropriation of the *bourgeoisie*. In discussing the pro and con of both co-operative movements, M. Vandervelde comes to the conclusion that only socialistic co-operation in connection with the other forms of proletarian organization is an efficient weapon in the struggle of the proletarians against the capitalistic system.

Whether or not one agrees with M. Vandervelde, one has to recognize his clear reasoning and the concise and attractive presentation of the matter.

Wholesale Prices, Canada, 1912. Report to the Hon. T. W. COTHERS, K.C., M.P., Minister of Labour. By R. H. COATS. Ottawa: Government Printing Bureau, 1913. 8vo, pp. xvii+255.

This report is the third of an annual series issued by the Canadian Department of Labour, and prepared by Mr. R. H. Coats. The comparatively unimportant part played by Canada in economic discussion has prevented Mr. Coats from receiving the recognition that is due him for his excellent statistical work. Several years ago Mr. Coats adopted an index number for Canada based on the average of prices in the period from 1890 to 1899, and comprising 272 commodities. An unbroken record of prices from 1890 exists, due largely to his efforts.

Prices in 1912, as registered by the index number, were higher by 7 points than prices in 1911; the index number for 1911 was 127.4, for 1912, 134.4. The same increase is indicated by a comparison in different years of family budgets. A weekly expenditure for staple commodities by a family of five, based on a yearly income of $800.00, in 1911, was $12.89, in 1912, $13.63. The groups of commodities showing most marked increases of price in 1912 were grains and fodders, animals and meats, fish and dairy products. Numerous charts and tables present in minute detail the wholesale and retail prices of several hundreds of commodities. Comparisons with English, American, and Australian prices show that prices in Canada have followed a world-movement.

Mr. Coats refrains from analyzing the world-rise of prices. The quantity theory as revised by Irving Fisher is stated, and the statistics of gold production are given. One feels in reading the report of Mr. Coats that the author, in common with most compilers of prices, is prone to confuse the index number, which is an average of individual prices, with general price levels which the index number is an imperfect attempt to indicate.

The Story of a Bank. By WILLIAM HORACE BROWN. Boston: The Gorham Press, 1912. 8vo, pp. xxiv+213. $1.50 net.

This little volume is more worthy of attention than a glance at its title-page might indicate. Instead of being a "story" of a bank it is a historical account of the Second Bank of the United States, with a preliminary survey of one

chapter on the First Bank. The author points out in considering the First Bank that it was the offspring of necessity, created to bring order out of the financial chaos that existed under the Confederation; that it served its purpose well, but was destroyed at the end of its tenth year by political intrigue, in the mask of constitutional prerogative.

The treatment of the Second Bank is, likewise, from a political point of view. Its ruin is attributed to the fact that both parties were using it as a political instrument and that neither strove for a scientific and efficient banking system. A complete account is given in this portion of the book of the irregularities in administration and the riotous manipulation of the bank by its officers, both prior to and during the Jackson régime.

Aside from this general survey, the book contains considerable documentary matter. The correspondence that passed between Biddle, president of the bank, and Ingram, secretary of the treasury, may be found especially valuable as indicative of the trend of the "bank war." Second only to this in interest are extracts from Jackson's messages which in turn are ably answered by Clay's speeches in the Senate.

The introduction to this volume by George E. Roberts, director of the Mint, should not go unnoticed. A more accurate and concise statement of the weakness of our present independent treasury system, and a more convincing argument for the establishment of a central bank, could scarcely be produced in so few words.

Consumers and Wage-Earners. By J. ELLIOT ROSS. New York: The Devin-Adair Co., 1912. 8vo, pp. 139. $1.00.

The first part of this work attempts to solve the wage question by shifting the responsibility for certain evils, such as low wages and unsanitary conditions, from the employer to the consumer. The line of argument is substantially this: "Labor has a right to 'a fair wage for a fair day's work.'" If employers fail in their duty of meeting this right, then the obligation neglected by the employer must be assumed by the consuming class, in the capacity of indirect employers. This contention is supported by the four following arguments: (1) The consuming class, as indirect employers, are bound to maintain just conditions for employees. (2) The consuming class, as buyers, are bound to pay full value of the article, which must be sufficient to give the persons employed in its manufacture and distribution a living wage. (3) The consuming class, as buyers, co-operate in an injustice when they buy an article made under unjust conditions by (*a*) furnishing the means for committing the injustice, and (*b*) urging such production by this financial support. (4) The consuming class are bound to seek the social good and that demands the payment of fair wages.

The later chapters of the book are given over to a statement of a theory of industrial organization, and the author's opinion as to what constitutes a fair

wage. Considerable statistical matter is presented in this connection, showing the effect of low wages and bad conditions on health and morals.

The author's statement of the case is concise, logical and interesting. It presents the wage question from essentially the same point of view as that held by the consumers' leagues. The chief criticism to be offered is that the author's theory savors strongly of the iron law of wages and the Marxian theory of value.

Child Labor in City Streets. By EDWARD N. CLOPPER. New York: Macmillan, 1912. 8vo. pp. x+280. $1.25 net.

Dr. Clopper demonstrates in this book that the worst form of child labor —that in the city streets—is subject to little or no regulation. That this form of child labor has been neglected more than that in the factory, is due, he reasons, (1) to the familiarity of the public with the newsboy, bootblack, messenger boy, and others, which has caused a general disregard of the real demoralizing conditions of the work, and (2) to the erroneous conception that the youthful street trader is an "independent little merchant" who is receiving valuable business training. Although the author discredits this reasoning on the latter point, he fails to make his case as strong as he might have done, if he had likened street trading to the contract or piece-work systems in vogue in certain industries such as garment-making.

The book sets forth the conditions under which the child laborer of the streets works, and the limited extent to which regulation has been carried in both the United States and in Europe. Many significant statements are quoted from the reports of various investigating commissions, as tending to prove the direct relation of vice, retardation, etc., to unregulated child labor in city streets. *Prohibition*, so far as this may be attained, is the remedy suggested, with regulation where prohibition is impossible.

An extended bibliography and appendices are included in the volume. Appendix A gives the law of Wisconsin relative to street trading, which is the best law of any state on the subject.

The Story of Cotton. By EUGENE CLYDE BROOKS. Chicago: Rand, McNally & Co., 1911. 8vo, pp. x+370. $0.75.

Written, primarily, as a textbook for the upper grades of high schools, *The Story of Cotton* has features that will make it useful as collateral reading in economic history for elementary university courses. The beginnings of cotton culture, the difficulties involved in the early manufacture of cotton, and the methods used to surmount these difficulties are described in a simple and interesting style. The first half of the volume is a résumé of the industrial revolution from the standpoint of America and cotton, and Professor Brooks succeeds in making a familiar story decidedly attractive. In his later chapters

the author, in the vein of a thoroughgoing exponent of the "materialistic conception of history," writes the history of the southern states. The division of America into the cotton and the non-cotton states; the political consequences of this division resulting in the tariff issue and eventually the Civil War are traced; the immediate effects of the war, the difficulties of the reconstruction period, and the ultimate industrial awakening of the South are described, all in terms of cotton. The closing chapters contain simple explanations of the processes of cotton manufacturing, the culture of the cotton plant, the different varieties of cotton, and the growing uses of its by-products. Professor Brooks has infused into the prosy subject of cotton a flavor of romance, which will make his book doubly valuable as a text.

The Economic Outlook. By EDWIN CANNAN. London: T. Fisher Unwin, 1912. 8vo, pp. 312. 5*s*. net.

Professor Cannan has here collected eleven papers that he has struck off on one occasion or another and has put them into permanent form under the above title. With a single exception they deal with problems in economic organization such as the poor laws, pauperism, socialism and municipal ownership, and the application of economic principles to them. The exception referred to is a carefully written paper on Ricardo in parliament. Ricardo is here set in a most attractive light as one busied with the practical affairs of the kingdom in a large-minded and genuine way. The records show his vote and influence invariably thrown on the side of freedom and enlightenment. The author points out in the introduction that this article is in the nature of an addendum to his *History of the Theories of Production and Distribution from 1776 to 1884*, in which he maintained that with the early nineteenth-century economists "practical aims were paramount and the advancement of the science secondary." It is easily the best thing in the collection. On the whole, however, these papers, written for the most part for special occasions and with regard to some current problem, lack the freshness which they had in the time that called them forth and have not the solid qualities that would make them of really permanent value. They scarcely deserved to be exhumed and put into book form.

Educated Working Women. By CLARA E. COLLET. London: P. S. King & Son, 1912. 8vo, pp. vii+143. 2*s*. net.

This is a reprint in book form of six well-written essays on the economic position of women workers of the middle classes in England during the last half of the nineteenth century. Census statistics are presented to show the existence, in these classes during that period, of far more women than men. The economic sequel of this unequal distribution of the sexes is pointed out to

have been the appearance of an ungrounded expectation of marriage among many of these women which worked to prevent them from becoming economically independent when young and made them disappointed, weary, and old, when their mental and physical powers should have been at their prime. Sample expenditure accounts presented indicate that the salary of this group of women was such as not only to make the maintenance of a good working efficiency impossible but also to decrease seriously their age-limit of usefulness. Improvement is advocated through education, co-operation, and striving after a sound economic ideal. A retrospect of fifty years discloses encouraging progress and plainly shows the sure rewards for efficiency. Although restricted in viewpoint, and inspired by conditions more or less temporary, this book of essays deserves wide dissemination because of its illuminating ideas on the question of the industrial relationship of the sexes and the more general problems of working women.

Monarchical Socialism in Germany. By ELMER ROBERTS. New York: Scribner, 1913. 8vo, pp. 200. $1.25 net.

The book contains a series of articles about the present economic and social policy of Germany. Germany, as is well known, has gradually passed in the last few decades from extreme individualistic to more socialistic views in the economic as well as in the social field. In the economic field, this change of views manifests itself in the nationalization of industrial enterprises, regulation of industrial combinations, and above all in the nationalization of the German railway system which is one of the most important factors in Germany's economic policy. In the social field, the social insurance legislation, the organization of vocational education for the working classes, the public employment agencies, the experiments with employment insurance, etc., are the best witnesses of the recent changes in Germany's social views. Elmer Roberts discusses all these measures in a broad manner without entering too much into the details. His title *Monarchical Socialism in Germany*, is unhappily chosen. He means state socialism, a term which expresses much better this movement of thought than "monarchical socialism," which is misleading. The chapters are written more or less independently of each other. The book would have gained in value by more uniformity of presentation. Nevertheless it is written in an attractive manner so that it will interest the student in economics as well as the general reader.

Where Socialism Failed. By STEWART GRAHAME. New York: McBride, Nast & Co., 1912. 8vo, pp. xii+266. $1.50 net.

This volume "is a straightforward account of Sir William Lane's bold attempt to realize socialism at New Australia and Cosme in Paraguay," by transplanting a colony of Australian socialists to an undeveloped tract of

land near Asuncion. The author obtained his information first hand, having spent a year and a half in the colonies, and is well qualified to present a vivid description of the conditions under which the colony was established and the difficulties to which this communistic society gave rise. It may be noted that some of the classic objections raised to socialism, among which are the questions of morals, of the distribution of clothing, and of the apportionment of labor, presented the precise difficulties that caused a split in the ranks of this society before the colonists had disembarked.

Specific doctrines of such well-known socialists as Bernard Shaw, H. G. Wells, Robert M. Blatchford, and William Morris are openly refuted by the author who undertakes to demonstrate their impracticability by the results of this costly experiment. That the failure of the society was due to communistic methods rather than natural conditions is evidenced by the fact that the same colonists later succeeded as individuals though they failed woefully as communists.

Regulation, Valuation, and Depreciation of Public Utilities. By SAMUEL S. WYER. Columbus, Ohio: The Sears & Simpson Co., 1913. 8vo, pp. 313. $5.00.

This work, printed on onion-skin paper and bound in flexible leather, is a successful attempt to compress into a small volume an enormous amount of information on public utilities. Though written by a consulting engineer and intended, no doubt, especially for the convenience of that profession, it by no means limits itself to engineering problems. In fact, seven out of the fourteen chapters constituting the text proper deal with economic and political problems almost exclusively. Much of the volume consists of brief extracts from books, and from government, court, and commission reports.

In the seven chapters dealing more particularly with engineering and accounting problems, the topic of electrolysis in connection with depreciation is given especially full and careful treatment. Illustrations and diagrams add much to the interest and value of the book. Chap. xv consists of tables for reference in connection with various engineering and accounting problems, etc.

The information offered on most of the topics taken up is necessarily brief and fragmentary. The bibliography is extensive. Both this and the index are very well arranged.

Christianity and the Labor Movement. By WILLIAM MONROE BALCH. Boston: Sherman, French & Co., 1912. 12mo, pp. 108. $1.00.

The author describes the limitations of his treatment of a vast subject by saying that he does not attempt to discuss the fundamental economic facts and principles of his subject; certain explanations and theories of ameliora-

tions are assumed as proved elsewhere. The object here is "to enforce the urgent social mission of the church, to indicate the critical duties thrust upon us by the labor problem, to mark some paths toward timely social service." The particular chapter headings are: "The Estrangement of the Church and the Wage-Earners;" "Labor's Complaint against the Church and against the Social Order;" "The Cheapness of Human Life;" "Labor Unions;" "A Social Creed;" "Socialism;" "What Christian Men Should Do." The one most important truth brought out by this interesting little book is that the leaders of the church need to study social science, especially economics, in order to understand the ethical problems of our industrial and commercial age.

Les Marchés financiers de Berlin et de Paris et la crise Franco-Allemande de juillet-octobre 1911. By JEAN LESCURE. Paris: Larose et Tenin, 1912. 8vo, pp. 46. (Reprinted from Revue Économique Internationale.) Fr. 2.

This pamphlet deals with the disturbances of the Paris and Berlin money market at the time of the Franco-German crisis in 1911, occasioned by the Morocco affair. Withdrawal of deposits; restriction of credits by the banking institutions, and especially of credits allowed to the stock-exchange speculation, by limiting the loans granted in form of reports and lombards; sudden downward movement of the stock quotations; rediscounting by the banking institutions of a part of their portfolio, answered by the central bank by increasing the discount rate—in short, all the incidents more or less observable at all times of monetary stringency in the European money markets are here brought out in a clear and concise manner. For anyone who wishes to know how a banking system with a central institution operates in times of panic, this little pamphlet will prove very interesting.

Man or Machine—Which? By AL PRIDDY. Boston: The Pilgrim Press, 1912. 8vo, pp. ix+111. $0.75 net.

The first half of this book is concerned with the changes that the factory system and the division of labor have wrought in the industrial order. Most important among these are the loss of personal pride and initiative resulting from the separation of the individual from the finished product, the wide gap that the entrepreneur has allowed to come between himself and his workmen because of his increasing executive duties and the strenuous competitive struggle into which he is forced. The second part of the book shows how the workman may assert himself, in spite of these difficulties, through a more complete mastery of the machine. For improved methods of production arising from a better application of the old or from invention of new machinery, the

producer stands ready to pay abundantly. The author accordingly ventures the following law: "The more mechanical the world becomes the better type of workman we should produce."

Genetics. An Introduction to the Study of Heredity. By HERBERT E. WALTER. New York: Macmillan, 1913. 8vo, pp. xiv+272. $1.50 net.

Professor Walter has presented within the compass of a small and readable volume some of the most important results of recent research in the problems of heredity. He has been notably successful in abbreviating the discussion of time-worn commonplaces and in offering interesting explanations of aspects of the subject too newly developed to have been treated in previous general works. His style is sufficiently ready and vigorous to give life even to a rather needlessly technical vocabulary. A useful brief bibliography is offered. The book as a whole may be warmly recommended to intelligent students of the social sciences, for whose information it seems to have been especially intended.

Hygiene for the Worker. By WILLIAM H. TOLMAN and ADELAIDE WOOD GUTHRIE. Chicago: American Book Co., 1912. 12mo, vii+231. 50 cents.

This little volume is one of a series of books which the authors have prepared as an aid to the teaching of hygiene in the elementary grades and in vocational and industrial high schools. It treats of such topics as clothing, food, and exercise, alcohol and tobacco, anti-tuberculosis measures, home hygiene, and the particular needs of cold and hot weather. It advocates the teaching of a daily hygienic routine, and hygienic inspection at the beginning of each day's school work.

Panama Canal, What It Is, What It Means. By JOHN BARRETT. Washington, D.C.: Pan-American Union, 1913. 8vo, p. 120. $1.00.

This somewhat superficial description of the Panama Canal and its surroundings seems to be partially designed as a guide for tourists, as well as to arouse general interest in our relations with the South American republics. It is argued that the building of the canal will bring about such a social and commercial awakening in South America as to demand our immediate attention and afford a magnificent opportunity for developing mutually friendly and profitable relations. While lacking in orderly arrangement and logical treatment, the book has several good maps and many attractive illustrations.

Charakterbilder. By GUSTAV SCHMOLLER. Munich and Leipzig: Duncker und Humblot, 1913. 8vo, pp. vi+302. M. 7.

Professor Schmoller presents in the *Charakterbilder* a series of sketches of some of the leading personalities in Germany in the last two centuries. Sovereigns and statesmen, savants and men of letters, officials and captains of industry, in great part men with whom the author has been personally acquainted, are the characters, of whom he draws most interesting portraits. These articles, previously published but scattered hitherto through a variety of newspapers and periodicals, are collected here for the first time.

The American Mediterranean. By STEPHEN BONSAL. New York: Moffat, Yard & Co., 1912. 8vo, pp. xiv+488. $3.00.

A historical account of the development of customs and institutions among the peoples inhabiting the islands of the Caribbean Sea is here given in an interesting and popular style. Appendices present a small amount of financial material, the treaty with the Republic of Panama, canal legislation, and the Hay-Pauncefote Treaty; but the book is primarily serviceable to the traveler and the historian, rather than to the student of economics.

Woman in Modern Society. By EARL BARNES. New York: B. W. Huebsch, 1912. 12mo, pp. 257. $1.25.

To the rapidly increasing literature on the disputatious subject of *Woman*, Professor Barnes has added *Woman in Modern Society*, a book which says a good many things which need to be said and which succeeds in rubbing off some of the artificial glamour with which many are wont to glorify women's present achievements and position. The author subscribes to the belief that the equality of men and women is one of supplementary activities alone; only by recognition of this principle of mutual dependence can the work of either of the sexes be made complete. To use his favorite words, man supplies the katabolic energy, woman the anabolic power. With this fundamental theory always in mind, and with appreciation of the heritage with which the past has endowed her, the author discusses woman's relations to education, to industrial and political life, and to family life. In none of these activities does he believe the satisfactory solution has been reached; each situation bristles with problems. One of the most suggestive points in the book is the assertion that there is no longer a question of women's rights, for these either have been already gained or will be gained soon; the emphasis must now be laid on women's duties.

To criticize in detail the author's beliefs, some of which are conventional and some liberal, is useless, since that could be but the measuring of one personal opinion against another. The reader is bound to encounter scores

of statements with which he may disagree. But that must be reckoned a benefit, if the book stimulates thought while presenting an opposing view. It is worth reading, for it is clear and dispassionate, seeing alike foibles and excellencies.

Farm Management. By G. F. WARREN. New York: Macmillan, 1913. 8vo, pp. xviii+590. $1.50.

As one might infer from the title, the problem to which the author addresses himself is that of how to secure the greatest net profit to the individual farmer, or as he puts it, "the greatest possible labor income." In general, according to Professor Warren, this is to be secured by organizing and employing the production factors at the farmer's disposal in such a way as to secure the greatest economy in production. Once the *type* of farming is settled upon, it becomes a question of the most profitable investment in and use of acreage, equipment, live stock, labor, etc. The distinction is constantly drawn between greatest possible production and that production which will yield the greatest net profit. After pointing out the prevalent sources of waste in farm management, notably that due to the incomplete use of horse and machinery power on the farm, the author shows how much of this waste may be eliminated and strongly recommends that farmers adopt a system of cost accounting to that end.

The clear and at times rather pithy mode of expression is supplemented by many interesting and suggestive cuts and diagrams. Probably the arrangement of the treatment could be improved so as to avoid unnecessary repetition. In support of the main thesis the method is scientific, and is based upon the results of much personal experience and travel and of wide investigation. The author, however, attempts to cover a good many questions aside from this, and at times his statements appear somewhat gratuitous, and rather superficial. For instance, in discussing the question of crop yields per acre in the United States, he fails to take account of the character of the seasons, and unless one reads with extreme care, one is likely to infer that the fertility of the soils in the United States has greatly increased. The book should prove valuable to the practical farmer and should afford him much interesting data to work upon. Its conservative, practical tone may well prove to be a good antidote to the flood of superficial literature that has recently been published on the general subject of agriculture.